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March/April 1961

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Functions of a Systems & Procedures Department

PART II

A. Richard DeLuca

▶ It is the purpose of this part of the series of five to describe the *areas* in which systems and procedures personnel may serve management. Some references are enumerated for those who wish further to investigate or study the areas.

Management Audits

A management audit has been defined as ". . . a comprehensive and constructive examination of an organizational structure of a company or its components, such as a division or department, its plans and policies, its financial controls, its methods of operation, and its use of human and physical facilities."[1]

A management audit program consists essentially of the following areas of study:

1. Organization Analysis
2. Policy and Practice Review
3. Company Compliance with Legal Regulations
4. Effectiveness of Systems and Procedures
5. Personnel Utilization and Practices
6. Layout and Physical Equipment
7. Management Controls[2]

The final product of a management audit is the audit report, which sets forth the purpose and scope of the study, outstanding areas for improvement, a summary of the auditor's findings, conclusions, and recommendations. This report serves as a springboard for corrective action by management.

Ideally, a management audit should be the *first* task undertaken by a systems group, since it will provide the basis for developing both short- and long-range programs for the systems and procedures staff.

Office System Surveys and Programs

An office systems program consists of the study and improvement of administrative, as opposed to technical, problems and practices. Such a program usually consists of a number of systems studies involving one or more organizational units within the enterprise.

Each study encompasses the following activities by systems and procedures personnel:

1. Plan the study, develop its objectives and scope.
2. Isolate specific parts of the problems involved, and provide a basis for evaluating the feasibility of the study plan.

1. Victor Lazzaro (Ed.), *Systems and Procedures* (Prentice Hall, Inc., Englewood Cliffs, 1959), p. 96. Hereafter cited as *Lazzaro*.

2. Lazzaro, p. 111.

3. Redefine the problem and adjust the original plans on the basis of this preliminary survey of the problems involved.
4. Record and analyze facts.
5. Develop a solution, include consideration of effects on work flow, equipment requirements, and policy changes.
6. Write and coordinate the proposed procedure.
7. Prepare the report.
8. Put the recommendations into effect.
9. Follow up the installation. Determine whether results have been accomplished, make necessary modifications, insure that all replaced routines have actually been discontinued.

Forms Control

A forms control activity by systems and procedures personnel serves four basic objectives:

1. Assures that unneeded forms do not exist, and that every form serves a unique and useful purpose.
2. Promotes effective design of forms, so that they will actually accomplish the uniformity and simplicity they were created to facilitate.
3. Specifies economic and timely production, procurement, and distribution of forms.
4. Provides for review and study of both old and new forms, as a stepping-stone to the identification and resolution of procedural and organizational problems.[3]

Forms are the raw material of all paperwork. Even today, with the use of mechanized data processing techniques and equipment, the great majority of information handling operations in an enterprise are accomplished through the use of paper forms.

Systems and procedures personnel themselves admit that this area of paperwork is greatly neglected and often looked upon as a lower grade of work.

The outstanding advocate of forms control, Frank M. Knox, has bluntly stated that forms control is "one of the most neglected phases of . . . cost control in the office . . ."[4] He indicates, by example, that this area of systems work is lucrative in terms of savings which can be measured tangibly.

Records Management

It is a curious paradox of modern business that the manager who complains most loudly about being "snowed under by paperwork" is the very individual who files "for future reference" every piece of paper created by his personnel.

A consultant who specializes in records management — the controlled retention and destruction of paperwork — has made the following observations concerning our paperwork dilemma:

> Our annual paperwork cost is a multi-billion dollar figure that exceeds the annual federal budget. A mountain of paperwork casts a shadow of inefficiency and waste over the land. Documents, the majority of which have become worthless in less than five years, are stored in expensive containers in costly space long after they have fulfilled their purposes.[5]

A records management program may be comprehensive, controlling paperwork through its full cycle, from the moment of creation until destruction. Records management in this sense encompasses forms design and control, work simplification, reports improvement and control, and quality control of paperwork. Records management—as an established record storage, retention, and destruction program — constitutes a significant systems function which merits separate treatment. Such a program usually encompasses the following activities:

1. Inventory and appraisal of existing records.

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3. *Simplifying Procedures Through Forms Control.* Bureau of the Budget, Management Bulletin, 1948, p. 1.

4. Knox, pp. 77-80.

5. Milton Reitzfeld, in Lazzaro, p. 223.

2. Development of a complete records retention schedule.
3. Establishment of the organization and procedures required to activate and maintain the records management program.
4. Periodic destruction of useless and obsolete records.

A sound records management program will produce these benefits:

1. Release floor space and file cabinets for other uses.
2. Minimize the amount of filing and floor space required for record storage.
3. Use less expensive storage space for retention of inactive records.
4. Improve filing practices, thereby effecting savings in labor costs.

Company Manuals

Company organization, policies, and procedures comprise the basic contents of most office manuals. Manuals serve as a management communication tool; they guide both management and operating personnel in effectively carrying out their responsibilities, and keep personnel informed of organization, policy, and procedural changes. In addition to serving as official channels for the downward flow of management information, manuals serve the following purposes:

1. Facilitate training of operating personnel by serving as on-the-job reference guides.
2. Serve as job evaluation aids.
3. Constitute training material for supervisory and executive training.
4. Reduce need for repetitive decision-making.
5. Clarify organizational relationships, responsibilities, and structure.
6. Establish a basis for control and internal auditing.
7. Insure coordination of related activities.
8. Promote constant review and improvement of policies, procedures, and organization.
9. Provide a valuable source for studying information flow and creating a total systems concept for the enterprise.

Manuals may be devised to serve company-wide interests, or they may apply to limited groups. Examples of the former would be organization manuals, finance manuals, policy manuals, and inter-departmental procedures manuals. Examples of the latter include sales manuals, engineering manuals, and departmental procedures manuals.

Work Sampling

Clerical work sampling is the application of quality control techniques to repetitive clerical operations. It simplifies control over errors, performnce, and work-load; it provides a method for obtaining analytical data, such as the average number of items per output lot, and the average error level. The benefits of sampling, as an alternative to 100 per cent verification, are numerous:

1. Provides a basis for deciding whether it is cheaper to perform a 100 per cent check, or to check samples of varying sizes, depending upon the work quality needed or desired.
2. Measures the rate of error involved in checking operations.
3. Reduces personnel time involved in performing checking operations.
4. Facilitates record keeping for work measurement purposes.

Work Measurement

A pioneer in the field of clerical work measurement has defined this activity as:

> . . . the comparison of a standard with the result of the expenditure of physical or mental effort . . . The essential value of work measurement is that it provides a basis for determining the extent of progress and improvement in productive effort by comparing what has been done with what is being done.[6]

6. William H. Brush, in Lazzaro, p. 148.

In addition to serving this basic management objective, work measurement also provides an improved basis for accomplishing the following management functions:

1. More effective planning and scheduling of work.
2. Improved forecasting of manpower requirements.
3. Determining most economical work methods.
4. Determining time and cost of performing work.
5. Establishing proper work assignments.
6. Selecting personnel for specific tasks, and evaluating their worth to the company.
7. Locating work areas which require further improvement.[7]

In the office, labor is the greatest single cost, notwithstanding the advent of electronic data processing equipment. Yet, paradoxically, the same management which employs the most recent industrial engineering techniques accurately to measure the factory worker's output, all but ignores the office's productive record. Usually, there is no record! This is where and why work measurement comes into the picture. The systems and procedures analyst profession is destined to play a key role in the inevitable awakening of management to the many values of work measurement in the office.

Work Simplification

"Work simplification is the organized application of common sense to finding better and easier ways of doing every job . . ."[8]

Work simplification involves the recognition of a problem need or inefficient situtation, and the application to it of basic systems analysis techniques in order to arrive at an improvement or solution. Such elementary tools of systems analysis are used as work distribution charts, flow charts, process charts, right-and-left-hand charts, office layouts, and forms analysis sheets.

Work simplification is a technique intended for use primarily by supervisory personnel. The role of the systems man is to train the supervisor in the application of the basic analysis techniques, so that work simplification becomes a working tool for management, whereby the supervisor may develop improvements within his own area of responsibility. Since the systems man ordinarily can concern himself only with procedural analysis and improvement of major systems or interorganizational functions, the training of operating supervisors as "systems analysts" will be both a necessary and a profitable undertaking.

Budgets and Cost Control

A budget is an instrument of both planning and control. Its formulation forces a degree of orderliness in management thinking which might not otherwise occur. Budgets serve to correlate planning and allow greater delegation of authority without loss of control. In addition, by providing monetary standards against which actual performance is compared, they serve as a prime cost control tool for management. Several types of budgets are employed by management for planning and control:

Expense and Revenue

Produce Planning

Sales

Production

Advertising

Inventory

Capital Expenditure

Balance Sheet[9]

The systems and procedures men can and should play a vital role in the establishment of budget systems throughout an organization. Their experience in handling a variety of management information gives them an almost unique capacity to "see the big picture" with regard to what management needs in terms of planning and decision-making data.

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7. Brush, *op. cit.*

8. George R. Terry, *Office Management and Control* (Richard D. Irwin, Inc., Chicago, 1949), p. 628.

9. Harold Koontz & Cyril O'Donnell, *Principles of Management* (McGraw-Hill Book Co., Inc., New York, 1959), pp. 597-600.

Equipment Standardization

Because of the significant role which office supplies and equipment, ranging from erasers to electronic computers, play in successful office work, some form of control over such materials is both desirable and necessary. One major aspect of this control is "standardization." Systems personnel, working with office administrators or purchasing agents, establish standardization programs which entail the following actions:

1. Develop standard specifications for each item of office equipment and supplies.
2. Establish the necessary property accounting and inventory control systems.
3. Arrange for efficient and economical repair services.
4. Establish the mechanics for a replacement program.

The advantages of such a standardization program are numerous — and profitable:

1. Selection of *proper* equipment and supplies is facilitated.
2. Existing equipment is made available for more efficient use, through location control and knowledge of substitutability.
3. Timely replacement of worn-out, obsolete, and outmoded equipment is provided for.
4. The experience gained in the course of establishing the standardization program creates personnel who can serve as consultants on problems pertaining to the selection and use of equipment.
5. Reduction of the total *number* of specific equipment types, models, or items maintained in stock effects great cost savings.[10]

Office Automation

Automation in the office applies to any device which mechanically, electrically, or electronically performs functions which would otherwise be performed manually. This work improvement tool, merely an extension of the scientific management movement into the area of clerical and administrative (as opposed to factory) activities, ranges in scope from the simple use of carbon paper to the operation of giant computers and electronic data processing (EDP) networks.

The systems man plays a vital role in office automation, for he is qualified, by virtue of his analytical experience and his knowledge of the company's systems networks, to perform the tremendous amount of pre-planning, analysis, and synthesis which *must* be accomplished if an automation installion is to be successful.[11]

It is not the purpose of this work to explain in capsule form the subject of office automation, which is too broad and complex to be adequately described in the brief space allotted. Suffice it to say that an ever larger portion of the systems man's job is concerned with the improvement of office operations through the introduction of automated equipment and techniques.

Management Research

The most common connotation of the term "management research" is operations research. Operations research (OR) may be defined as:

> A scientific methodology—analytical, experimental, quantitative—which, by assessing the over-all implications of various alternative courses of action in a management system, provides an improved basis for management decisions.[12]

The operations research approach involves four main phases:

1. Develop a precise quantitative model or description of the problem;
2. Find the best available quantitative solution to the model;

10. Terry, *passim.*

11. Michael Shegda, "Management Planning and Action For Successful EDP Installation," *Journal of Machine Accounting* (September 1959), pp. 12-20.

12. John W. Pocock in *Operations Research, A Basic Approach.* Special Report No. 13 (American Management Association, New York, 1956), p. 9.

3. Test the solution realistically; and

4. Implement the solution.[13]

The systems man can and should play a cooperative role in OR programs. He can add immeasurably to their effectiveness by performing the following functions in the program:

1. Develop a definition of the problem, gather the necessary facts, and develop the necessary "total system" concept which the OR worker requires before he can develop his mathematical model.

2. Work with the OR personnel in developing the necessary techniques and processes required to implement the system developed through OR technology.

Management Research in a Broader Sense

The use of operations research in conjunction with systems and procedures work is not the exclusive scope of management research, as conceived by this writer. Indeed, a broader interpretation includes several other areas of activity, which are valuable to systems personnel in their work. These are research activities in office management, integrated data processing (IDP), electronic, integrated data (EDP), and other modern management areas. Familiarity with these areas can be maintained through:

a. Subscriptions to professional journals and magazines.

b. Enrollment in courses offered by both professional and scholastic educational institutions.

c. Attendance at business and trade shows.

d. Participation in meetings and conferences of professional societies and associations.

e. Attendance at manufacturers' demonstrations.

f. Consultation with salesmen of office equipment and supplies.

The importance of encouraging research and of allowing the systems analyst time for carrying it out cannot be emphasized enough—particularly in the light of extremely rapid technological changes and advances which characterize the entire field of office and administrative management.

Summary

In this section, the reader was introduced to numerous activities which fall within the realm of the systems and procedures function. The multifarious benefits to business which can accrue from such work conscientiously performed should be fairly obvious.

The next section will consider the question: Where in an organization should the systems and procedures function be placed? **s/p/a**

13. Peter H. Butterfield, *et al, A Brief Introduction to Industrial Operations Research* (Stanford Research Institute, Menlo Park, California), a monograph presented at the Western Conference, Controllers' Institute of America, San Francisco, California, April 27, 1957, p. 3.

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Decision Making

▶ The most aggressive probing into decision-making techniques has come from those seeking to develop a management science. While traditionalists may accept some compromise of the principle of rationality, many management scientists seek devices and procedures which will reduce both nonrationality and irrationality to negligible factors in decision making. Thus their discussions frequently center on more precise ways of describing the choices confronting management. A good deal of attention is given to the precise definition of alternatives within these choices. And more recently a great deal of attention has been directed toward the identification of the probable "outcomes" of a particular alternative. The expected consequences of each anticipated course of action having been estimated, the critical step is that of maximizing utility or disutility by weighting these outcomes within the values of the organization.

One has the impression that there are those who look toward the time when numerical values, representing estimated outcomes, may be substituted for verbal symbols in a formula representing organizational goals, which would then be solved for a decision. Lest this seem incredible, it should be noted that it was done on a lathe operator's decisions long ago by Frederick Taylor, and his expectations are becoming a reality through the application of today's more powerful tools to a manager's problems.

If it is accidental that the term management science is almost a simple reversal of scientific management, it is not without significance, for there is a sense in which the current scientific, rationalist movement is essentially scientific management with new, vastly more powerful tools. Where Taylor used algebra, arithmetic, engineering knowledge, and common sense, we find calculus, probability statistics, and the scientific method.

But though the labels are similar and there is a continuity of purpose, it would be misleading to suggest that the current management science movement stems from scientific management. Although it has benefited immeasurably by the ready-made acceptance scientific management inadvertently prepared for it, the management science movement seems more accurately characterized as the confluence of several attempts to apply probability theory. Each attempt has had sufficient identity to acquire a different name, e.g., game theory, statistical decision theory, cybernetics, and operations research. The literature of management science can be conveniently reviewed within a description of three of these fields.

Research Notes and Comments, "*A Bibliographical Essay on Decision Making,*" by William J. Gore and Fred S. Silander, p. 112 in Administrative Science Quarterly, June 1959, published by the Graduate School of Business and Public Administration, Cornell University, Ithaca, New York.

Reprints of the entire article are available from the publisher.

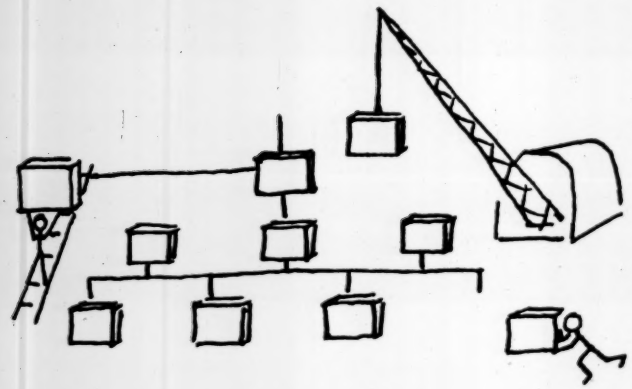
In point of time game theory might claim seniority since Von Neumann conceived the essentials of the theory in 1928. His work went largely unnoticed until the first edition of the *Theory and Practice of Games and Economic Behavior* in 1944 and the standard 1947 edition. This theory suggests that major economic policy decisions can be understood by representing them as games of strategy and chance analogous to poker, bridge, or the like. "In general, a game will have a certain number of players, say *n*. The game is composed of moves, which are of two types: personal, made by the players, and chance, in which one of several possible outcomes is selected by a chance device." As in poker the distribution of cards between the hands is made by a random device, and the players have certain choices as to how to play their hands. The rules of the game prescribe "the conditions under which players are allowed to make their moves, and thus tend to define the character and the context of the alternative moves open to them."

As a number of writers have pointed out, this amounts to translating a decision into a problem in the strategies of choice. The strategy is applied by a player against nature or competing players. This makes possible the second, and crucial, translation where the principles of probability are used to state the problem as a matter of selecting among alternatives each of whose probable expected consequences has been numerically weighted. Laplace is reputed to have explained statistics as the calculus of common sense. Most exponents of game theory echo his sentiments and add that what Von Neumann did was to provide in this analogy of the game a device for bringing reason directly to bear upon choices previously made intuitively, capriciously, or ignorantly.

The layman who would use this tool runs into an initial difficulty; the theory is most frequently presented in another language — the language of mathematical symbols. Fortunately the literature is now sufficiently extensive to include nonmathematical sources. One who is interested in only a speaking acquaintance with the theory may invest an evening in Arrow's chapter in *The Policy Sciences*, or in McDonald's piece in *Fortune*, "The Theory of Strategy," or in Snyder's discussion in *Research Frontiers in Politics*. For those willing to invest several evenings three non-mathematical books are available. Although Williams' *The Compleat Strategyst, Being a Primer on the Theory of Games of Strategy* has received a good deal of attention, perhaps because of its posture and relatively detailed explanation of specific techniques, Bross's shorter and more general work and McDonald's *Strategy in Poker, Business and War* are both excellent sources. Bross, for example, presents readily understood materials on probability, values, rules for action, sequential decisions, models, and statistical techniques. This would equip most casual readers for a further probing of the subject, and though it does not purport to serve as a systematic survey, Shubik's collection of readings is certainly one of the most useful starting points for many readers.

For those with scientific, mathematical, or statistical training some of the fundamental works on the subject might represent a jumping-off point. The 1947 edition of Von Neumann and Morganstern is already a classic and is almost universally referred to by other students. The two issues of the "Annals of Mathematical Studies" entitled *Contributions to the Theory of Games* must also be counted among the most important basic sources. But as of this moment the most comprehensive and integrated work available is the recently published *Games and Decisions* by Luce and Raiffa. **s/p/a**

Building an Organization



Peter A. Macary

Preface

▶ The main task of management is to develop and manage a productive team which will render a service to a customer at a minimum cost. Only as it accomplishes this is it able to guarantee a good profit margin and remain a prime contractor for the service. The measure of a management's success is seen in its sustained profit picture — its sustained organizational vitality and health. Recognizing this as a basic precept, this article considers some of the problems management has in maintaining a healthy organizational environment.

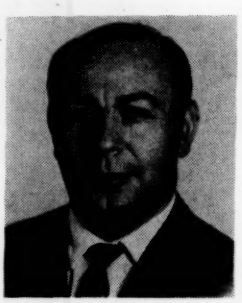
* * * * *

In developing, managing, and changing a team, management must have the overall point of view; must see the organization as a composite entity and try to visualize how any changes may affect that entity. Management decisions are too often reached through rough estimations—guesstimates—of probable effects. Secondary and inherent is the effect that the results of decisions will have on the members of the team.

The writer uses the word *management* generally; he includes all levels and types. *Team* can mean a department or the organization as a whole. By using these two words *management* and *team* generally, it is easier for the reader to apply the writer's basic points to his own situation.

During the immediate past, advances in technology have introduced new techniques to help management evaluate its decisions more precisely and to make information more rapidly available. Some of these techniques are referred to as operations research and integrated data processing. They may involve the use of electronic computers, and common language media. As these techniques are applied, management is faced with various problems and with dislocations even in organizational structure.

To alleviate the effect of these changes, it is essential that some group analyze them and their effect on the organization, so that proper



Peter A Macary has a degree in mathematics from the University of Connecticut. He is a senior industrial engineer at the Olin Mathieson Chemical Corporation, New Haven, Conn. He was previously with the Woodbury Manufacturing Company, the American Brass Company, the Revere Corporation, and the George S. May Company. He is a member of the Connecticut Chapter, Systems and Procedures Association.

management controls may be maintained. This is the challenge in analysis that faces systems and procedures people. If systems men look upon themselves as data processors or paper work specialists, they neglect the overall organizational problems and changes. Organizational structure and management controls need to be watched constantly and streamlined.

Organization

Organization aims to combine people into productive teams. Today, the knowledge used to help develop such teams is based on empirical observation and contains assumptions based on content rather than related to a form of organization. More research is needed to help us develop a "science" of organizational structure.

Organization is a conceptual structure born in the minds of men to combine the raw materials of the earth with the potential of men to produce things and services which make our lives richer. It takes the capital investment of society, the knowledge of people developed through the years, and helps to structure it so that optimum results are achieved for the company and for society. An organization is the skeleton framework which identifies relationships among the personnel of a team as they combine their talents to produce for the common good. To some extent, an organization is a form of regimentation. If used primarily for personal gain of the leader, we have the basis for tyranny. If used as a general guide, freedom exists even though each function is specifically located. It is only the misuse of an organization that begets tyranny.

Production

Management should approach the development of a unified organization as it would approach any other design problem. It must state the reasons for its organization and identify its members. It must define boundary conditions and set limits. To do this, the following should be stated and clearly understood by all the members of the organization:

The main purpose of an organization is to produce. Other purposes, such as earning a profit, providing jobs, and circulating money, result when there is a product or service to sell, but these other purposes will not materialize if production is not given the main emphasis. Obviously the only way an organization can survive is to produce.

To produce, members must be grouped according to certain essential functions. These functions are the basic elements of the organization. They define it completely. They are developed to answer the following questions:

a. Who are our customers? (Market Research)

b. What can we sell to them? (Product Research)

c. Where and in what can we build it? (Plant Engineering)

d. How much do we have to specialize these items? (Product Engineering)

e. How do we make this particular item? (Production Engineering)

f. How do we sell this item? (Sales)

g. When can we deliver? (Production Control)

h. Where do we get the raw materials? (Purchasing)

i. Who is actually going to make it? (Production)

j. How much should it cost? (Cost estimating)

k. How good have we made it? (Quality Control)

l. How much did it cost? (Accounting)

m. How do we keep up our productive facilities? (Maintenance Engineering)

n. What personnel is required to man the team? (Personnel Relations)

o. How shall we finance the operation? (Finance)

p. What is our legal status? (Legal)

q. What is our organization and how do we communicate? (Systems and Procedures)

All organizations from the small corner shop to large business empires that girdle the earth

must answer the above questions. It will be noted that each one identifies its own specialization. These specializations complicate communication and interfere with the ability to share experience throughout an organization. Only a very few persons are in a position to see the relationship among these specializations and to move from one to another. Such persons are naturally in the best position to correlate these specifications into a unified pattern. They are in the best position to see the structure upon which the organization in reality must be built.

Solutions to many problems of organization actually breed new problems if management does not observe these patterns and their interrelations. Many personnel problems arise from organizational malfunction.

In assigning functional responsibility and building for team performance, management must try to minimize the dominance of particular units required to build a product. As new tasks are assigned, they should be integrated into the basic organization. It must orient each function to the normal background and maintain an atmosphere wherein new personnel can adapt themselves easily and quickly.

When assigning administrative responsibility, management should avoid splitting functional responsibilities. If it does, it creates a condition wherein the same type of signal can come from more than one source. This creates a situation similar to a split personality. Signals may so counteract each other that no effective action is taken. If the output of certain organizational functions is examined, it looks as if only some produce an item which can be sold to a customer. Others produce merely data — instructions, orders, reports — which coordinate and simplify the task of producing and delivering the product. One way of looking at the productivity of an organization is as follows:

a. Production of a service (or item).

b. Development and maintenance of productive facilities.

c. Data processing.

In studying the function of data processing within an organization, certain facts are observable:

a. It is the only product from many functions.

b. It provides the only means of communication among functions.

c. It is the permanent part of an organization. Only the data remain to record the story of what happened.

When management is not fully aware of these facts, it neglects to structure its communication channels carefully.

Summary

The above discusses in a general way some of the basic factors management should observe when it tries to strengthen its organizational structure. When any of these factors are ignored, structural defects appear. The defect may result in a failure to perform, a failure to communicate, duplication, or sluggishness. Costs will increase. *Since profit is a measure of the efficiency of an organization, increased or excessive cost is a measure of the uncoordinated organization.*

An organization is analogous to the human body; it is fully as complex and subject to almost as wide a variety of ills and pains. The functions can be compared to the various organs of the body. Management can be compared to the will of the person; the data system to the nervous system of the body; and communications to the nervous impulses through which the mind tells the body how to react to the various stimuli and situations it faces. Just like the human body, organization is capable of infinite variations and talents. The systems and procedures group can become general practitioners to the body of organization. Business administration has specialists for the various functions but is in dire need of a diagnostician for the ills that permeate all areas of the organization. There is today no organizational science in a formal sense. Much still needs to be known before management can develop and manage effective production units. Some group must step forward and develop this science for management. The group most logically fitted for the task is the systems and procedures group. This is the challenge that faces systems and procedures people. If they fail to meet the challenge, some other group will. **s/p/a**

Operations Research Techniques as a Basis for System Design

Nicholas J. Radell

▶ This article describes the use of operations research techniques in business and shows how one of these techniques in particular is useful in designing systems. Four or five principal techniques have received the greatest application in business. A brief summary is given of each.

1. *Linear Programming* is probably the most publicized technique. It is useful in solving problems in which a number of interrelated decisions must be made. Typically, this technique is employed when an attempt is being made to maximize the profits or minimize the costs of some specific phase of a business operation. A classic case study concerns a transportation problem in which a number of trucks are being routed for delivery. The goal is to choose routes so that the costs of delivery are minimized.
2. *Queuing Theory* is a technique which deals with problems associated with waiting lines and processing points. A typical example of an application concerns the number of checkout counters that are needed in a supermarket. The number of counters can be related to such things as the expected waiting time for a customer in the checkout line during a peak load period.
3. *Game Theory* is a more recent development in the field of mathematics which has found limited application to real problems. It is concerned with the optimum choice of strategies in a competitive situation. While it appears to have limited application in business situations, it shows promise in several areas, including advertising. For instance, it could be used in determining whether to increase or decrease an advertising budget when sales are increasing or decreasing.
4. *Inventory Theory* has been developed to assist in the determination of certain inventory decisions. "How much" and "when" to reorder or produce a given item in a product line are typical decision problems. Fairly sophisticated mathematical formulas have been developed and applied in business situations.
5. *System Simulation* is the technique which will be discussed at length in this paper. It is a useful tool in measuring the effectiveness of a given business system. A system in this sense could be a management system; a control system; or an integrated system of men, machines, and material. System simulation has several primary values:

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1. It can be used as a research tool for measuring the advisability of changing certain operating features of a system.
2. It can be used to measure the merits of alternative systems including the expected improvement which can be obtained by replacing an existing system with a proposed system.

Systems simulation is used in business for both of these purposes. This paper discusses a system simulation case study conducted in a retailing environment.

An inventory management system was being designed for use in a particular department of a department store. The system used scientific inventory control formulas for determining, on an item-by-item basis, "when" and "how much" to reorder from a supplier. The purpose of the system simulation was twofold: (1) To evaluate quantitatively, alternate systems differentiated by the flow of merchandise between a warehouse, selling stores, and suppliers; (2) to compare the alternate systems with the existing system. The following system characteristics were variable:

1. Direct *shipments* to all stores from the suppliers versus shipments only to a central warehouse.
2. *Reorder* quantities and points based upon stock levels and sales rates for the combined total of all stores versus these same levels and rates for a central warehouse only.
3. Inter-store *transfers.*

Of course, qualitative considerations such as complexity and data generation have a significant influence on the ultimate choice of a system but were considered separately. The simulation deals primarily with certain features of the inventory system which can be measured quantitatively, notably, for a given sales demand: the average inventory to be carried; the stock-out condition that can be expected; and the number of orders which will be placed.

Four basic systems were selected for analysis. An illustration of the flow of merchandise in each, together with an appropriate explanation, follows:

System A (See Exhibit 1). The stores are coded on the charts as W (warehouse), D (downtown), N (northtown), and B (basement). Each store serves customers and carries a complete line of merchandise. System A is one in which the supplier ships directly to each store and an item's reorder quantity and reorder point are determined by each store's sales demand.

System B (See Exhibit 2). One of the stores (W) acts as a warehouse as well as a selling location because it has excess storage space. In this system, suppliers ship only to store W and store W in turn makes transfers to stores N, B, and D. The computation and use of the reorder quantity and the reorder point formulas for store W will, therefore, depend upon its total demand (customer plus other stores). Once the merchandise leaves store W, it is considered sold although it may only be replenishing the stock of stores N, B, or D. Predetermined replenishment levels at the other stores are based upon a replenishment cycle from store W.

System C (See Exhibit 3), is more complicated than B. Suppliers still ship to store W only. However, in addition to store W supplying stores N, B, and D, there are inter-store transfers between N, B, D, and W. Furthermore, the computation of reorder quantities and reorder points is based upon the total stock at stores N, B, D, and W. It is also necessary to use a distribution formula which indicates the amount of merchandise which will be transferred between stores.

System D (See Exhibit 4), is the most complex. In addition to the characteristics of C, it also allows a supplier to ship directly to all stores. A distribution formula is used to determine the amount of each inter-store transfer as well as the amounts shipped directly to each store.

These are the four systems which were considered in the case study. Through system simulation, it was possible to measure quantitatively for each system the average inventory level for a given sales demand and a given stock-out condition. In addition, it was possible to measure the relationship of inventory level between each proposed system and the existing system. Although the simulation could

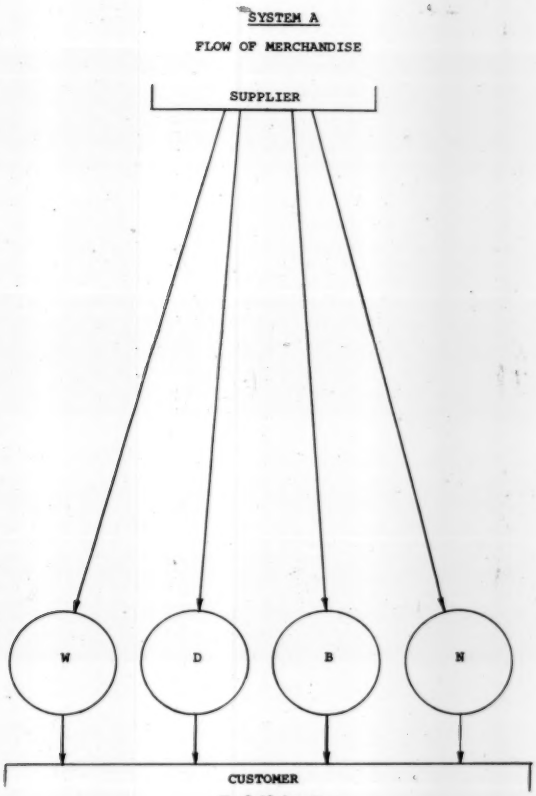
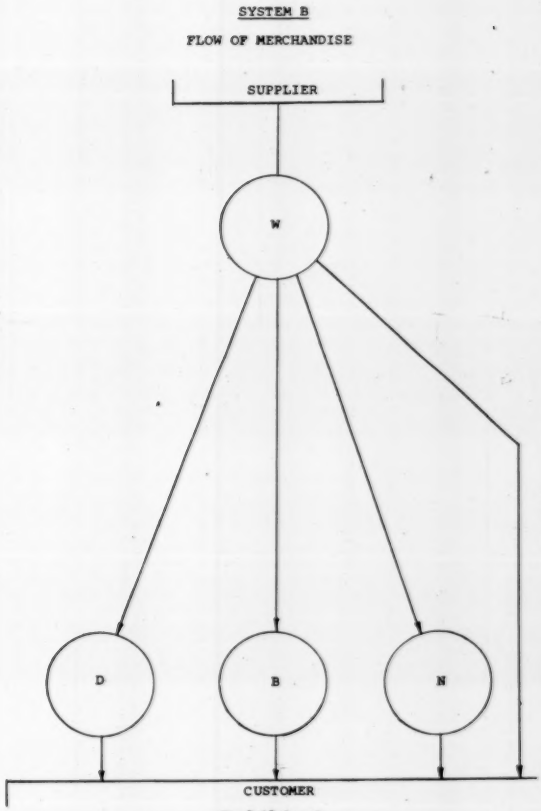


Exhibit 1



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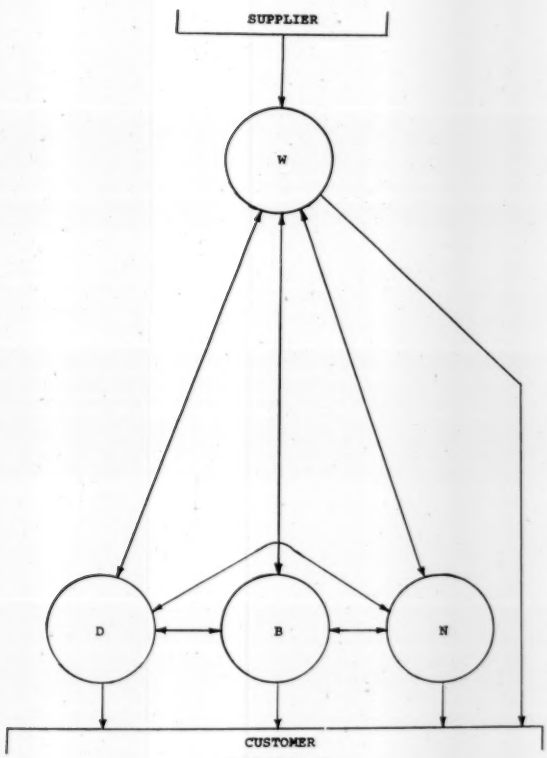


Exhibit 3

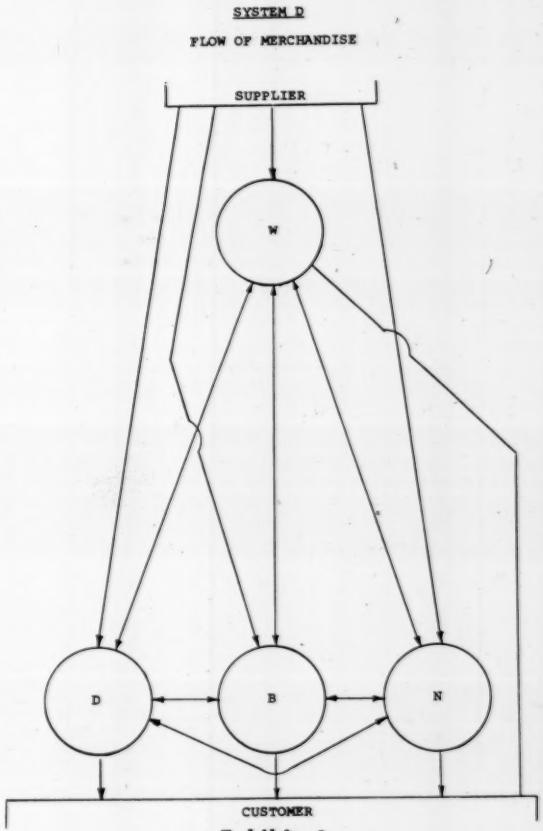


Exhibit 4

INVENTORY AND ORDER HISTORY

#601 FIREGUARD BURNER

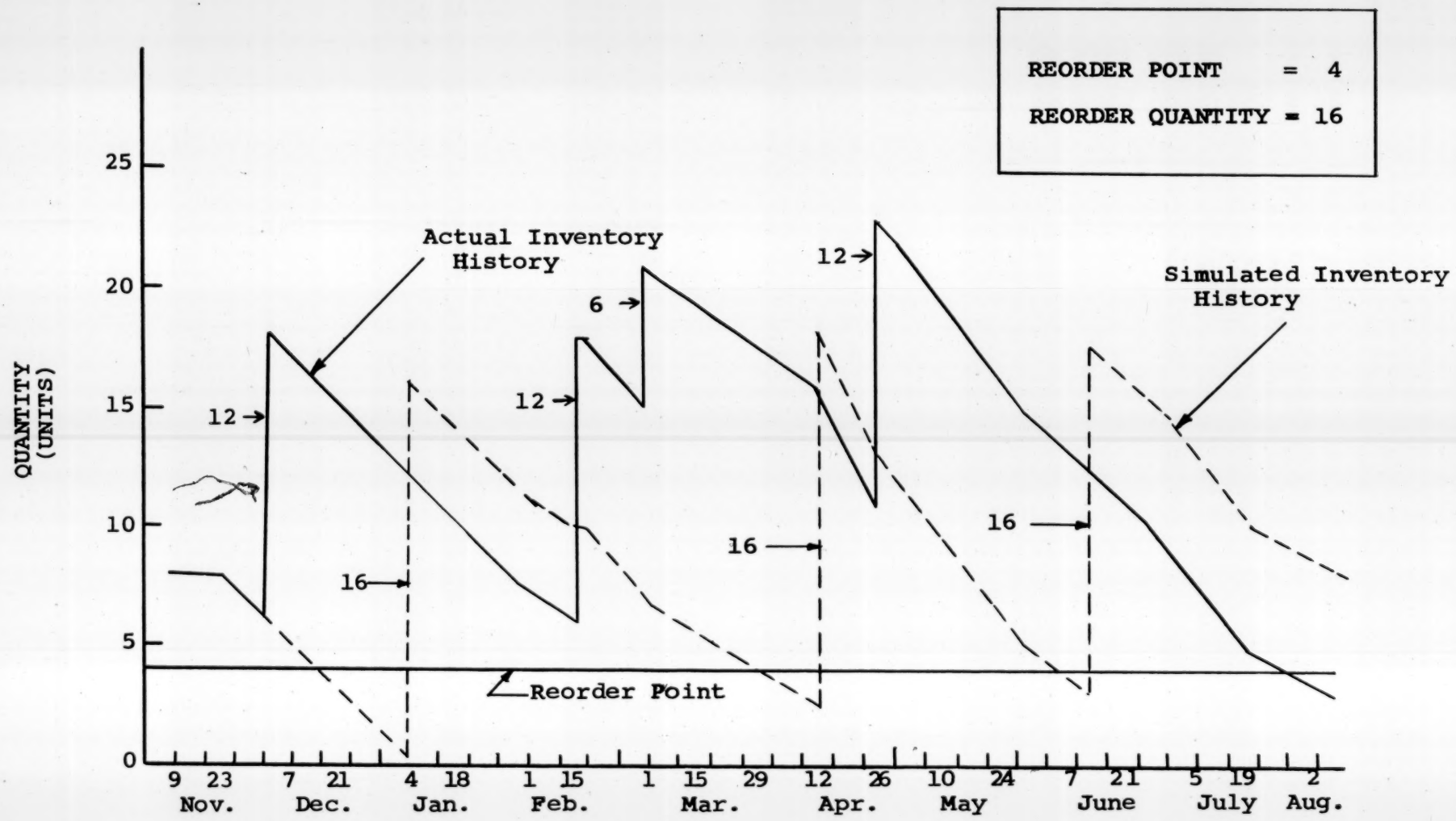


Exhibit 5

have been handled in several ways, a computer program was used in addition to manual techniques.

Exhibit 5 graphically illustrates the simulation for one item under System B for the warehouse store. The item is a No. 601 Fire Guard Burner, a trash burner that was sold in the subject department. The first step in the simulation was to construct the item's inventory history as it occurred under the existing system. The solid line represents the actual history. The vertical rises in the line represent orders which were received during the year. From this actual history it was possible, following the rules of each proposed system, to simulate what the inventory history would have been, had each proposed system been in use during the same period of time. The dotted line represents what the actual history would have been had System B been in use during the test period of time. As noted on the chart, the reorder quantity would have been 16 and the reorder point 4.

Prior to conducting the simulation, however, it was necessary to develop certain procedural rules. These rules helped assure an unbiased comparison between the actual and simulated history. Typical of the twelve rules used are the following:

1. The beginning and ending dates for the actual and simulated history are the same.
2. The rates of sales for corresponding periods must be the same.
3. Lead times used in the simulation histories are those which were experienced closest to the corresponding date on the actual history.
4. The sales and lead time forecast were based upon one year's experience prior to the start of our simulation period.
5. Reorder quantities were rounded to the nearest multiple of the basic packaging quantities specified by the supplier.

By using these rules and considering each system separately, it was possible to develop, for a sample of items, a simulated inventory history for each item in each of the four systems. Once this was accomplished, it was possible to measure the area under the simulated curve, count the days out-of-stock, and count the number of orders placed. A quantitative measurement between the simulated history and the actual history, when compared to the actual history, had a reduced inventory of 33 per cent, the same number of days out-of-stock, and one less order placed.

The average inventory level, days out-of-stock, and number of orders written for each item in each system were summarized and the totals compared to each other and to the results obtained using the existing system. The following table shows the results of this comparison.

TABLE I

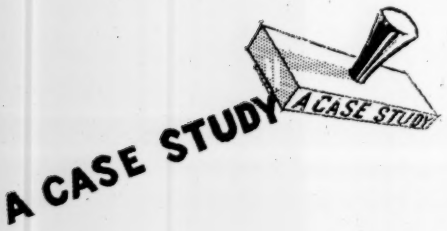
System	Per Cent Out-of-stock	Inventory Level (existing system 100%)
Existing	20%	100%
A	5	114
B	5	90
C	5	76
D	5	76

From the table one sees that the existing system was experiencing a 20 per cent out-of-stock condition with an inventory level defined as 100 per cent. In order for System A to have a 5 per cent out-of-stock condition, it would have to carry 14 per cent more inventory than was carried in the existing system. System B, on the other hand, would need only 90 per cent of the inventory carried in the existing system while reducing the stock-outs to one fourth of their previous value. Systems C and D could get along with 76 per cent of the existing inventory and still maintain a 5 per cent out-of-stock condition.

In this manner, one step was taken to measure the advisability of using Systems A, B, C, or D. As was mentioned earlier there are more considerations involved in deciding upon the final system and, while they influence the eventual judgment, the objective of this article will not be furthered by discussing them.

In the final analysis, System B was selected for installation. It was selected because it had the best combination of low inventory, cost of operation, and ease of installation and administration. **s/p/a**

Systematizing TWA Maintenance Accounting Records



Warren Harris

▶ Federal regulations which to some extent restrict airlines to operating within certain boundaries and according to certain rules require them to use and report a basically similar accounting and reporting system. Within the boundaries of this system, Trans World Airlines determines its accounting distribution on the basis of special types of expenses which are charged to particular departments. The departments have been set up to comply with the basic functional accounting classifications of the Civil Aeronautics Board (the Federal controlling agency).

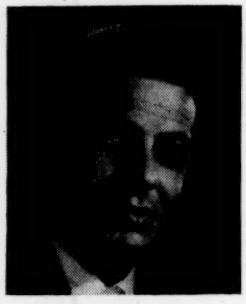
Imagine, then, recording the expenditure of $60 to $70 millions a year on the maintenance of approximately 200 aircraft when cost must be entered against several thousand separate projects. Projects can range from routine maintenance or a major modification to an airplane or a group of airplanes, to the manufacture, in one of the overhaul shops, of an insignificant, minute component. Projects can be completed at one of the major maintenance bases in the United States, at one of the 48 Domestic or 23 International cities served by the airline, or at all or any combination of bases and cities.

It is easy to see that this recording task approached Herculean proportions when the cost records were maintained manually. In addition, all reports and many of the accounting journals were prepared manually. In this last activity alone, we employed several persons who did not have time to analyze the results indicated by their records, because of the heavy clerical workload.

Alternatives

We had only two alternatives. We could either hire more help or we could make a thorough study of the situation and do our best to improve it. The first alternative was quickly eliminated; we could not hire more people because of budgetary limitations. We, therefore, began to analyze our current procedures to determine what could be done.

The first big item we observed was the cost accounts ledger itself. Each month, amounts such as labor costs and material costs were posted to the ledger sheets manually, according to the project. Account distribution was shown as the amounts were posted. As was mentioned earlier, this account distribution had been predetermined by project on the basis of the type of expense and the department to which the expense was to be charged. Some of the amounts posted were taken from machine



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tabulations by project, and as the amounts were posted to the project ledger, the account distribution was posted to the machine tabulation. Other amounts posted were taken from manually prepared listings. Both the manually prepared listings and the machine tabulations with the added account distribution ultimately became the source from which cards were punched for preparation of accounting journals.

The predetermined account distribution was recorded on a project master card in a permanent file in our cost accounting section. It was necessary to refer to this project master card each time account distribution was necessary for the project ledger postings. The project master card was prepared when the cost accounting section was advised of the opening of the project.

Mechanization

It seemed that one of the best ways to improve the cost ledgers would be to prepare them mechanically. Even before this study, all of our account journals were tabulated in final form on punched card equipment. Since we had account distribution and expense detail already included in punched cards, one of our primary objectives in this systems study was to use this information as economically as possible.

Our analysis of each of the account journals showed that each punched card used in the make-up of the journals could be machine reproduced on a standardized card that would be suitable for machine tabulation of project ledgers. The machine ledgers would include all the information that was presently shown on the manually prepared ledgers.

A conversion problem was to get the ultimate account distribution into our journals and onto the cost ledger cards without all the manual handling required in the past. This was done by punching the project master card information into a data processing master card, collating and matching the journal detail cards to our new masters, and reproducing account distribution information on the journal detail cards. Thus the detail cards could be sorted and summarized for account distribution to prepare the final journal and could also be automatically machine-reproduced on the cost ledger card format for preparation of our detailed project ledgers.

We also provided codes on the card that would eventually enable us to machine-produce certain reports, and we provided for auxiliary machine reproductions of summary and balance forward ledger cards that would enable us to machine-produce required account and special analyses.

The Foundation

Thus we had the primary foundation for a machine-produced cost ledger. Under the revised procedure, whenever possible, we are using the data processing cards from existing accounting journal systems and summarizing and reproducing cost ledger cards for later use in preparation of the cost ledger. In this process we are developing by machine most of the accounting distribution that was previously a manual procedure.

All cost ledger cards, along with project master cards, are sorted by project number. Project ledgers are prepared, including a description of the project. As totals are shown on the ledgers, summary total cards are produced on auxiliary machines with project balances carried forward; the balance forward total is analyzed by type of expense. The summary cards are eventually used to prepare mechanically the reports and account analyses previously mentioned.

Summary

Besides being better looking, our ledger is also more useful and practical than before. We have a procedure on data processing machines that costs TWA only a fraction of what it cost in the past. It enables us to obtain more information faster, and allows more time for analysis and the special reports that have been neglected.

We in systems have the additional satisfaction, in this day of the improved electronic computer, of proving to ourselves that a new solution to a problem does not need to exclude old stand-by machines and procedures, nor does it need to include the "latest" development in machines. **s/p/a**

An Old Axiom Re-Examined

Assign Responsibility and Delegate Authority with Commensurate Control

James C. White

▶ "Responsibility with commensurate authority" has long been an accepted principle in business administration. An examination of the concept in more detail, however, reveals several points which need clarification. For instance, it has been observed that, "You can delegate authority but you cannot delegate responsibility." This article is a brief examination, therefore, of the idea of delegation.

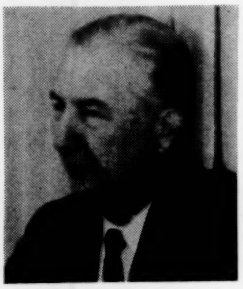
* * * * *

One of the presumptions of a supervisor, or an executive at any level of management, is that he can subdivide his general area of operations and delegate the responsibility for performing many of the smaller tasks to appropriate subordinates. This works very well as long as the desired results are obtained; but when a failure occurs, the supervisor becomes aware that he is still responsible.

Failures of this type account for many casualties in the ranks: demerits, disciplines (such as unpaid time off, suspension, or discharge), demotions, resignations, loss of confidence, and even change of personality. This is a high price to pay for managerial ineptness. There will, of course, always be failures; perfection cannot be expected. Also, unfortunately, one failure may more than offset a number of meritorious successes.

A successful organization, a composite of its entire personnel, must maintain a much better than .500 batting average in order to hold a competitive advantage. It is worthwhile, therefore, for management to strive conscientiously to reduce the casualty rate — to improve its batting average.

A first step, a preventive measure, is to make certain that the entire management team has a full understanding of the principles involved in the art of delegation. With these firmly fixed, there is less chance that someone will err because he did not know what he was supposed to do, how far he could go, or what was the measure of his accountability.



James C. White, a management consultant, has been associated with the General Motors Institute, Flint, Michigan (1928-45) and Packard, Ford, and General Motors Companies. He has lectured at several universities, has spoken for various professional associations, and was a conference leader at the 1954 International Systems Meetings. He is a charter member and a past president of the Milwaukee Chapter, SPA, was a member of the National Education Committee, a National Director, and National Secretary. He is active in many community organizations such as YMCA, scouts, and the Goodwill Industries.

W. N. Mitchell, Management Consultant of A. T. Kearney and Company, points out that the extents of delegation, responsibility, and accountability are often not clearly established in the definitions of organizational relationships. He states:

> "In any well-ordered organization, when one in the hierarchy receives authority, he must accept responsibility for performance in accord with the terms of delegation. He must also, by appropriate means, be held strictly accountable therefor. Thus, an executive may always delegate the authority with which he is vested unless the mandate under which this authority was granted him expressly forbids such delegation. But he cannot escape responsibility by an act of delegation. He must, in consequence, for his own protection in relation to his superiors see that means are established whereby his subordinates to whom authority has been, in turn, delegated are held strictly accountable *to him* for performance."

At this point, it is important to notice such statements as: *Responsibility* is *assigned; authority* is *delegated.*

Extended Responsibilities

Responsibility may be *extended*, but it may not be delegated. No matter how far the responsibility may be extended by step-down assignment to lower levels, the real responsibility still remains at the highest level of assignment at which the task was defined. Each level is responsible to the immediately superior level. A failure at any level must be absorbed at the next higher level. The superior should make certain, therefore, that each subordinate fully understands the assignment and appropriate authority delegated.

Responsibilities should be extended within an organization consistent with the nature of its activities, its size, the degree of functional centralization, operational decentralization, and diversity of locations. Responsibilities extended but not consistent with these fundamentals should be of only special or temporary duration, with the implication that they will be more normally extended when conditions have changed, and that efforts are being actively made to accomplish such necessary changes.

Considerable misunderstanding may be avoided in the extension of responsibilities by carefully distinguishing "staff functions" from "line functions." Line operations must carry out responsibilities within the limits prescribed by policies formulated and directed by staff functions. No responsibility should be extended which transcends this differentiation. Any task assignment which mixes staff and line responsibilities should be carefully avoided.

Operations consist of activities wherein a company invests its working capital in facilities, product design, manufacture, market promotion, and sales. Administrative *staff functions*, on the other hand, consist of activities which are concerned with monitoring the guide-lines — employment of people; public good-will; financial support; definition of acceptable risk; and standards, records, and reports — within which operations can proceed. Parenthetically, the executive in charge of a staff function does have to "operate" his department.

Specified Authority

When an area of responsibility has been expressly identified, the delegation of authority may be clarified by specifying it in terms of:

1. *Scope.* For each subject of authority, the delegation may be either general or special.
2. *Extent.* The delegation of authority may be either temporary or regular.
3. *Condition.* The conditions supporting the delegation may be either implied or explicit. It is, for example, implied authority for a treasurer to sign disbursement checks, or explicit authority for a chief engineer to specify product designs. Where authority is not implied in a position by its title, it must be explicitly stated and communicated to those who are expected to act in response to it.
4. *Type.* Type of authority depends upon the discretion and judgment of the superior making the delegation, upon the degree of confidence he reposes in his subordinate,

or upon the reservation he wishes to retain for himself:

a. *Direct.* The subordinate is granted full authority within his extent and scope to act in his own name.

b. *Nominal.* A delegate may be given authority to sign his superior's name in the manner of an agent.

c. *Restrictive.* The subordinate is requested by his superior to discuss any proposed exercise of authority with his superior before any actual steps are taken (this is concurrence before the fact).

d. *Advisive.* The subordinate is requested by his superior to keep him informed of any exercise of authority which has been taken (this is concurrence after the fact.)

Even when the areas of responsibility are clearly assigned and the respective authorities carefully defined, we note the following:

> "The matter of accountability is often glossed over to the detriment of a disciplined operation. The virtues of decentralized authority are often expressed, but quite frequently the importance of centralized control, under the circumstances, is neglected. Indeed, one of the most challenging problems of management is to decentralize authority successfully and yet maintain adequate means of centralized control."[1]

Accountability

Accountability refers particularly to the procedure by which expected results, established at the start, are compared to results. In this sense, *accountability* is synonymous with the term *control.* Accountability (or control) should, therefore, be established commensurate with the extended responsibility and delegated authority. Accordingly:

1. Where authority is general, regular, implied, and direct, accountability is expected to be reflected in a system of regular accounting and/or statistical records and reports.

2. Where authority is special, temporary, explicit, and nominal, restrictive, or advisive, the *method* of accountability may be delineated consistent with the wishes of the superior making the delegation, by a system of records and reports privately maintained between himself and his subordinate, or by special arrangement to utilize the services available under the controller.

On rare occasions the expression "unlimited authority" is used. It should be emphasized that there is no such thing as "unlimited authority"; there is always some form of accountability.

Allan Y. Davis, President, General Staff, Inc., contributes an interesting observation:

> "The military practice requires thinking out the nature of the delegation in terms of a true order, and then issuing the delegation as a task through an operations order, which, through the section dealing with administration and communications matters, almost forces consideration of the nature of control to be exercised."[2]

Conclusion

Putting this all together, the old axiom, "responsibility with commensurate authority," may be clarified and perhaps more adequately stated by saying that "responsibility should be extended and authority delegated with commensurate control."

With such an understanding and a careful adherence by the entire management organization to the principles involved, there is less likelihood of a failure arising from an improper assignment, nebulous authority, or an inadequate mechanism for the measurement of progress and results. Operations could then proceed with confidence and with the assurance of a well managed organization. **s/p/a**

1. Letter to author from W. N. Mitchell.

2. Letter to author from Allan Y. Davis.

Applied Psychology for the Systems Man

Edwin S. Raub

▶ How can a systems man use applied psychology so that he can better accomplish his objectives, for without the good-will and cooperation of others, he cannot succeed. Getting along with people necessitates understanding them.

No doubt we can all agree that a systems man must understand people. Since he achieves results through others, he is successful to the extent that he understands the people with whom he works and is able to motivate them to accept or install new procedures. The efficiency expert who coldly and analytically reviews and assesses the inner workings of a department, without considering its "climate" or the feelings and prejudices of the people involved, will more often than not arouse fears, antagonisms, and even passive resistance to his recommendations, even when they are constructive ones and of value to a department. This problem of getting things done through others is probably not new to the reader. Some today may still find this to be their most serious problem.

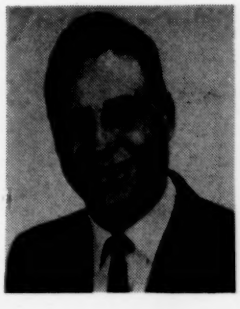
It is not easy to find a good technical man who also knows how to deal with people. How does one gain the acceptance of people whose systems are being reconstructed or reorganized for more efficiency? The whole matter boils down to the question: How can we understand people better?

Understand People

The problem of understanding people is not unique to the systems man, but because of the peculiar nature of his work, he is probably more aware of it as a problem than those in other occupations.

Each of us has probably been trying to understand people almost since birth, and the success or failure we have had is today reflected in our personalities, and in our behavior to others as we try to gain our objectives and face our frustrations. The well-adjusted person has been reasonably successful; the not-so-well adjusted one is likely to be disillusioned. One cannot run away from the problem of people.

Most systems men have learned the hard way that people do not "buy" a procedural revision on its merits alone. Most have learned that no matter how beneficial a recommended procedural revision, it is met with some form of resistance. It crops up even before a study is made. At the very outset, the analyst's



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motives are eyed suspiciously, and he is called names which leave no doubt about the esteem in which he is held by his "victims." Even psychologists can sympathize with the systems man here, for all who work in advisory capacities are faced with the problem of gaining acceptance and breaking down resistance. Yes, if the systems man is to be successful, he must account for the human element. He must take time to understand people enough so that he can motivate them along beneficial paths. Management is looking everywhere today to find men and women who understand people and who have learned how to work with them with maximum results.

A psychologist's approach to understanding people begins with the belief that he is a scientist. This is important, for it means that when dealing with human relation problems he tries to be objective. He tries to guard against coloring the interpretation of what he observes by subjective feeling and beliefs. This may be where a psychologist differs from a layman. Often a layman's prejudices lead him to believe what he *prefers* to believe, rather than what can be proven by the facts. A psychologist is trained to accept facts which may be contrary to his beliefs or wishes. He is also trained to act in accordance with the facts, even though he might prefer an easier course of action. He knows he cannot argue human nature into changing. He takes human nature as he finds it, and works with it, not against it.

Inasmuch as all systems men are amateur psychologists, and inasmuch as they are all interested in learning more about people so that they can function better, here are several helpful principles.

1. Have an interest in people *as people*, not as just hands or payroll numbers.
2. Have as much interest in people's abilities as in their shortcomings. Accentuate the positive.
3. Have a desire to help people improve or solve their personal problems (but not in the Dorothy Dix way).
4. Have a real liking for people and an appreciation of their individual personalities, despite their weaknesses and peculiarities.
5. Seek to understand more about people.

Look Behind Words

Upon writing out the above principles, the author is struck by the inadequacy of words. Words without emotion or illustrations are sterile things. All of the principles just expressed are loaded with meaning and their implementation takes a lot of effort. Take for example, the first one — Have an interest in people as people, not just as hands or payroll numbers. One cannot manufacture such an interest; one cannot read about the need to be interested and say "Now I'm interested." One must FEEL this interest and WORK at keeping it constructive.

Those who are selfishly concerned about themselves will find it difficult to become interested in others, except as they can benefit from such an interest.

Then take principle No. 2 — Have as much interest in people's abilities as in their shortcomings. How many of us can accentuate the positive in dealing with people. How much easier it is, with our own private feelings of uncertainty and inadequacy, to laugh at others and impress upon them how inadequate they are. How easy it is to find fault, to dislike a person's color, his race, the school he went to, the town he came from, or the department he works in. How difficult it is to find nice things to say. How difficult to THINK nice things. How difficult to think positively. The point should be clear. No one can, through words of wisdom which are casually read, really help you do a better job of working with and understanding people. There is no magic prescription. Understanding people begins with a DESIRE to do so. And then you must be willing to accept facts which may sometimes be unpleasant. You must avoid keeping so busy with the tools of your trade, or your own personal problems, that you don't have time to study the people with whom you work. Do not get too busy to think.

It is not enough to know what it says in the books; if you are too busy with incidentals of the work to study the people around you, you may get lost in the woods because of the trees.

Look at Yourself

The next thing to do if you want to work better with people is to take a good hard look at yourself. The better you understand yourself, your own fears, prejudices, beliefs, and needs, the easier it is for you to guard against damaging your relationships with the people with whom you work and live. If, for example, you believe that college graduates make the best supervisors and managers in business because they are more intelligent and better informed, you may want to check the facts. This may be a personal prejudice. It may be a belief of yours because you are a college graduate and it helps to allay your fears and feelings of inadequacy. Such a belief may result from a need to maintain a feeling of superiority. Such a prejudice can lead one to believe what he prefers to believe. So, by taking a good hard look at yourself, you may begin to accept facts contrary to your present beliefs. You are more likely to take human nature as you find it and to work with it — not against it. You'll try to accentuate the positive, and eliminate the negative, or at least minimize it.

Look at Your Beliefs

How did you acquire the beliefs you have? What really is right and what really is wrong? Most of us say and do things we believe to be right and avoid those which we believe to be wrong — most of the time. But we do not often subject these beliefs to critical analysis. How often have we, when challenged, been unable to back up a belief with fact? How often have we found ourselves grasping at straws? How often have we replied with the comment, "I just know it's true, that's all," or "Well, it's obvious, everybody knows that."

Take a brief look at the growth and development of a personality. Start with the infant. What does he believe? We surmise that he knows nothing at least as you and I visualize things. He does not know the outside world. He does not identify objects as existing apart from himself. All of his awareness is centered in the pursuit of his own comfort. When not comfortable, he cries, and, somehow, his wants are satisfied. This behavior continues in some measure until the infant becomes an adult. But when he becomes an adult, the process is expected to reverse itself. The adult must bend to the needs of his environment. The world does not exist FOR him but IN SPITE of him. He must adjust if he is to survive as a reasonably happy person. Much happens between years 0 and 21, and most of us, as adults, struggle with the problem of bending to the demands of our environment.

As we grow and live day by day, we are concerned with satisfying our needs, and with the pursuit of happiness. This is not easy. We do not always get what we want. We run into obstacles which must be overcome. The degree of success we experience as we grow, and the degree to which we learn socially acceptable ways of overcoming obstacles, determine the manner in which we face obstacles as adults and the strengths we have to overcome them. For example, the fat boy in the neighborhood who is teased and unable to hold his own in his age group may become the bully who picks on slight people and forces them to pay attention to him. Or, the man who has always been somewhat timid and has not achieved as he wished, may turn envy into hate and, for example, resist any systems man who comes into his department. In such a situation, he may not appear timid at all, for he thinks he is fighting for survival.

What do people want from a job? Let us consider the following:

1. Standing or status — importance in their own estimation and that of their associates.
2. Belonging — being accepted, needed, and wanted.
3. Security.
4. Adequate pay.

Pay is last because studies show this is not as important as other factors.

Status, standing, the need to belong, to be accepted, tie in with security and are the things a systems man threatens when he enters a department. Well-adjusted, reasonably confident people do not feel the threat and will cooperate readily. Their disagreement usually

is reasonable and can be resolved amicably. They have open minds. You can TALK to them. The others, the ones who seem unreasonable, guarded, skeptical, and cynical are the problems. They are shaky and lack self-confidence. They have built up patterns of defense, so as not to reveal their weaknesses to the world. The armor is so hard it cannot be penetrated. It has to be taken off.

The systems man must be careful of the impression he creates and the manner in which he sells his services. He must be careful not to wear the EXPERT symbol on his shoulders. It is not wise to give the impression that you have all the answers. A systems man is to help and teach. He cannot impose his will on the people.

You probably know that each department you go into for assessment has what might be called its own personality or climate. The systems man must be aware of these differences. One situation calls for a particular set of responses, methods, or solutions while another calls for a different set. The difference may not result so much from the people involved, including yourself, but from the facts. The systems man must help employees and supervisors identify these facts and develop solutions that consider them. Approaching problems from the factual point of view can help to minimize emotional overtones.

One way to gain the cooperation of people is by getting them to participate whenever possible. Get them to recognize that it is their job to review their problems and to determine solutions which are agreeable to them. They know their jobs, their systems, and their problems much better than you. As a specialist, you are there to provide them with tools, techniques, and measuring instruments such as flow charts to help them reflect on and solve their own problems. They are full partners in the investigations. You, the systems man, have no preconceived notions about them. You are merely assisting them to solve their problems for optimum results. When a project is completed in this way, chances of having recommendations accepted are greatly enhanced, because the recommendations are largely the result of their own work.

Summary

Getting along with people requires understanding them. Understanding them requires a strong desire and interest on your part. It also requires taking a hard, critical look at yourself. The systems man must think beyond his specialized training. He must be flexible, open-minded, and humble. He must do more than say that he likes people. He must feel it, and show it. He must accept the facts as he finds them and work with them, not against them. He must guard against his own biases. And finally, he must get participation. The more the systems man can get people to participate in the solutions to their own problems, the more successful he will be. **s/p/a**

Changing Your Address

Notice of change of address for the Systems and Procedures Magazine (except from members in chapters) should be received in the Systems and Procedures Association office, 817 Penobscot Building, Detroit 26, Michigan, before the first of the month preceding the month of issue. For instance, if you desire the address changed for your May/June issue, we should be notified of your new address before May 1. *Be sure to include your postal zone as well as your old and new address.* Members in chapters should route their change in address through their chapter secretaries.

Echoes of a Seminar

Jose Rafael Davila Quintero

The following is a translation of an article originally submitted in Spanish. No effort was made to Americanize it too much for, as the reader will see, the very unusualness of some of the idiom and syntax make its thought-provoking message more poignant—Ed.

▶ Having recently attended a *seminar* with some of my business associates, I perceived more clearly the true meaning of the word. In my language, the word *seminar* brings to mind a cluster of seeds. In reality, a good seminar is a seedcase of human knowledge and leaves with one thoughts which are worth re-examining later.

During the seminar which I recently attended on electronic data processing, we heard documented and illustrated expositions. We exchanged ideas about methods and procedures. We heard of machines to accomplish results that seem like a dream. To hear about and witness the operation of, for instance, an "electronic brain" is an impressive experience. Nevertheless, something even more superior and complex than learning about the perfection of new equipment was achieved at this seminar. It was the multiple experience of commenting, chatting, and joking with associates during the intervals between seminar sessions and at meals.

Before the seminar, those who attended knew little or nothing about each other. This, however, did not keep us from sharing, from the very beginning of the session, in a spontaneous and generous way what we knew or thought about the subject being studied. With a simplicity similar to that displayed among old friends, each tried his best to make his contribution. During this experience, the author thought as follows: Machines! . . . Men! . . . The human being has been and will always be in contact with and struggle stubbornly with *things*. This is a part of his daily and unbending destiny. But the relation between man and *things* lacked its dramatic potential until the initial creation of the machine, almost 200 years ago. Since then, slowly but with increasing intensity, period after period, mechanization has been removing deep social strata and subordinating, to a considerable extent, other extra-personal dimensions as well as time and space. Thus many things which previously would have seemed like witchcraft are now within reach. Mechanization, without any doubt, enriches

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a man's intellect; but how far does he spoil it because of his lack of proper psychological foresight?

The luminous devices and discoveries result from men's creative impulses. That is to say, the same inner force that induced man to polish silica to make necklaces in the remote past, now, in our industrial civilization, induces him to offer assorted types of machines. Along with these achievements, the human being raised and still raises institutions; refined and still refines material forces as he sublimates and seeks his own comfort from his creativity. In summary, all this gives body and width to constant human enterprise.

As man imagines, sculptures, and promotes, to achieve his own comfort, he does not succeed completely, not even when luck is on his side. In some instances, a human being and the society of which he is a part are wounded if not destroyed by the former's own creations. This is the reason why the life cycle can be summed up in three words; birth, suffering, and death. These words do not call for discouragement but for thought. It is hoped that he who imagines, discovers, or applies something, even the most disconcerting thing, is mature enough to administer and control the discovery. Without that maturity, the things discovered so far had better remain ignored as are the forces and natural laws we do not yet even suspect. Atomic energy is a good example. It had existed through the centuries. Yet it was not used — even with the limitations with which it is used nowadays —until the capacity of a few determined individualities was mature enough for that. It is to be noticed, though, that this maturity is enjoyed only by a few individuals.

It should be observed that neither the discoveries, the devices, nor the amazing applications necessarily mean danger for the human being just as a toxic administered with sufficient dilution does not mean danger. Danger is due to negligence or lack of skill and lies in the use, physically or psychologically, of any product. Danger rests in allowing the common man to act without guidance or orientation. It rests in neglecting to carry enough information to the average person.

In the eighteenth century the affirmation was circulated that "man is naturally good." This unsupported affirmation has inspired, and still inspires, instruction, education, and other orienting efforts in several countries. Man is really neither good nor bad, but a potential for goodness or evil acting according to the concurrence of assorted factors.

In the nineteenth century, the affirmation of "indefinite progress" further invaded cultivated thought.

Nobody doubts that the machine, besides being indispensable, will continue to be imposed because of our need to govern *things*. The Roman Empire faced a similar problem, the necessity to govern *things*, and its failure was due to the lack of mechanized technique. On the other hand, notice that the machine becomes an *alter ego*, with the advantage of being accurate and being able to work faster. Be careful with the infection that this superiority propagates!

Centuries ago, Cervantes' pen described the attack of Don Quixote on the windmill. Such a procedure — absurd as it may seem — can be interpreted in different ways. Among these interpretations is the idea that an invading mechanization provokes an opposing reaction.

It is worth remembering this interpretation even though the machine, in its multiple uses, is imposed by our need to govern *things*. Generally, the machine is an invader, unless we prepare for it first, and thus reduce the psychological harm that the colossal machine can do to the common man.

Things became particularly preponderant after the First World War, 1914-1918. In fact, the nineteenth century and the first years of the twentieth century have been called the "polytheism of nations." Each country became like a domestic deity, with the plain ways of quiet living shaken at times on the surface but without deep worries.

These now are the years of the "bright century," "the indefinite progress," "the natural goodness of man," and of other such expressions.

Postwar years, willingly or unwillingly, have also brought many interdependencies. Economies, shattered by the last war, gave the

government of *things* a renewed preferential place. The reconstruction of fields, cities, and fleets was undertaken; natural resources were exploited; trade among nations was accelerated; private economy was efficiently developed. All of this asks for a maximum of technical efficiency, and the help given by statistics, information, and other elements to manual labor alone is no longer enough. The government of *things* makes of the machine an essential instrument.

Final Considerations

The degree of advancement reached due to mechanization entices and absorbs the common man. As in other aspects of life, the common man becomes the easy victim of the contributions of the more gifted. Admiration of mechanization without an adequate psychological defense minimizes, if not destroys, man. This phenomenon is noticeable in the time in which we are now living, in which there are so many human anchors shattered and so few social magnetic needles working. Hence the special danger.

Naturally, it would be presumptuous to say that there are no sensible orientations as far as mechanism is concerned with which to counteract the dangers that threaten mankind. The seminar made us realize that. This article—"Echoes of a Seminar"—should help us realize the following:

First. The personnel engaged in operating extraordinary machines must realize that all the marvels machines render are only the reflection of the excellencies of human beings. We should not lose sight of man's struggle with *things* from the beginning of history. Reflection about the possession of fire, the wheel, the screw, the mechanism will strengthen man's security and encourage him to undertake new conquests in the fields of progress.

Second. In each working place where a machine of particularly extraordinary operation is used or repaired, posters should be placed which read something like this:

THIS MARVELOUS MACHINE IS A DEVICE AND AN ACCOMPLISHMENT OF SOMETHING EVEN MORE MARVELOUS—A MAN LIKE YOURSELF.

s/p/a

Does This Sound Familiar?

Resistance to change is as old as man. Almost everyone is guilty of it at one time or another. In so doing, however, the usual reason is to avoid an undue risk, when often the greater risk is standing pat.

Check these comments and the logical answers to each:

1. "But it won't work for us." Perhaps not, but if one searches hard enough he can always find reasons why it won't. Be sure to distinguish between a reason and an excuse.
2. "We don't have it in the budget." Budgets are guides to thoughtful action and are not intended as a means to put good ideas in the deep freeze.
3. "But the old system is working O.K." This does not say the job cannot be done better, faster, or more economically, to the best interest of all concerned.
4. "Let's be realistic." This implies that the speaker is a person with logical, well organized ideas, while others may be dreamers and irrational.
5. "Let's wait until after the holidays (or the election or after the first of the year, etc.)." Indulge in procrastination and ultimately the speaker will come to this—the utter inability to make a decision of any kind.
6. "But the art is in such a state of flux—let's see what comes out next year." This comment recognizes that we surely live in an age of progress. But did this man wait for color television, or did he profit with the best that was available?

A Look at the Systems Profession

M. J. Lonergan

▶ I don't know how you got into systems work, but I have an idea that you started the same way I did—fell into it. While pursuing an education, I thought of many professions to which I might aspire, but systems analysis was never one of them. In fact, I was not aware that there was such a profession. My introduction to systems work was through a chance assignment to a systems task force. I was assigned to assist in a major cost reduction program being led by the Systems Department of my company. I have been in systems work ever since.

The Composite

The background of men in systems work is usually something like this: college graduate, with a BA, BBA, or BS. Majors range from economics or accounting to biology or ancient history. The point here is that there is no core curriculum or agreed-upon set of required courses for preparing a systems man. A lawyer has a curriculum; a specifically defined area he must study. The same is true for the accountant, the engineer, the doctor, the educator. As a result these men are held in proper perspective. They have "well defined" places within their organizations. This is not true, however, of the systems profession. Systems men are not formally trained as systems analysts. Consequently, they tend to adopt the attitudes, desires, and rules of the companies they work for when they start their systems careers. The company "attitude" toward systems work usually is that it is a tool to assist in the overall effort to reduce costs. Therefore, a company usually wants its Systems Department to show dollars and cents savings. Company rules are usually quite simple; the Systems Department will work on a project only when it is invited or ordered to; systems men will not ferret out problems that need attention. This results in a class of systems men who wage a continuous campaign to prove the need for their existence. They try to tack a dollar value on everything they do. There are of course exceptions to the above composite but in general it is a true one.

The Problem

The future must bring some changes in this situation and one of these is that the systems man must define systems work. Having functioned now for at least a decade, he has had time to think, to study, and to cross-breed. *He* is beginning to realize that he is usually more effective and more valuable to a company when he tells the company where his services are most needed; when he tells the company exactly what a systems man is. The inference here is not that the systems man is going to start running the company, but he should start to run the systems department. The systems man must make management see the picture of what he represents more clearly. This is easier said than done. Where does one start?

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Let us consider this problem by first analysing companies' attitudes toward systems work as expressed in the following statement:

The Systems Department is a tool or part of a constant effort to reduce costs.

The systems man cannot become a true professional by being only a "part of"; he must be "it." A lawyer handles *all* of a company's legal problems, an acountant handles *all* of a company's accounting, an engineer, etc. What is the systems man *part* of—a cost reduction effort? It would be foolish to suggest that a systems department be the *whole* cost reduction program. Systems men are not qualified to handle some of the *parts* that touch production, personnel, sales, and other aspects. So if cost reduction is the only index for measuring systems work, then the systems man must be relegated to the ranks of a non-professional or, at best, to the ranks of a weak and not indispensable profession.

What is the answer? The answer, as far as this writer is concerned, must satisfy two conditions.

a. The systems man must be of greater value to the company than he is currently. In whatever phase of company activity he becomes "it," he must be more valuable to a company than a "part of."

b. The systems man must attain an indispensable professional status within his company.

The Solution

The area the author suggests as the basis of all systems work is related to the industrial communications problem and has two aspects:

1. Communication of *intent* from top management to employees.
2. Communication of *results* of company operations from operating areas to top management.

Communication of Intent. The solution to this part of the problem starts with a good organization chart and is supplemented by (a) permanent communication or "policy" and (b) operating communication of day-to-day management commands.

Systems men must design procedures so that a company operates the way management wants it to—according to policy. Systems men must also provide the mechanism for communicating those day-to-day management commands. These commands must follow a prescribed form and route so that operating areas affected will be aware of their new responsibilities and, where necessary, be provided with the mechanism of discharging them. That is, the systems man's first responsibility is to design and maintain good organization charts. Then he must design procedures, according to policy, following the prescribed lines of organization.

Communication of Results. All records—files, sales summaries, production figures, cost records, profit statements, etc., are kept for two reasons: to comply with the law and to apprise management of the condition of the company: How well is it operating? How well did it operate? How well can it expect to operate?

The higher one goes in management, the greater is the percentage of time spent in decision-making. A decision is only as good as an individual's knowledge of a situation. Therefore, all procedures written to help communicate operating *results* to top management should be reviewed to make sure that they gather pertinent information which will eventually add to a management knowledge. They should be reviewed to be sure that information is not being perpetuated which is just interesting and nice to have around.

The systems man becomes then a communications man. He has two especially important areas in which to write procedures: (1) The operation of the company as top management wants it to run; (2) The control of the company. The latter procedures are particularly important since management does not have time to give personal attention to many lesser control functions. Usually the procedure *is* the control. This important fact is overlooked. It helps to keep it in mind if one thinks of information and the path it follows as communication, and of the piece of paper that carries the information as the method of making that communication. The piece of paper can be a tab card, a teletype tape, a production ticket, or a magnetic tape. Inefficiency in methods must be eliminated. However, it

is the information that management uses—or does not use — which is important. To have management make a bad decision because of poor or insufficient information can be far more costly than to have too many clerks or too many pieces of paper. The author believes that if information as defined here is controlled, the method will also be controlled.

Conclusion

It is only incidental that in doing an effective communications job the systems man affects the cost reduction effort appreciably, but then so do the lawyer, accountant, or engineer when they do an effective job.

The best way for a systems man to do his job is always the way that gets the right information to the right place at the right time in the form needed. The *best way* will not result in excess information or omit pertinent information. The systems man is not looking for the cheapest way to do a job. His first interest is to be sure that the job is necessary and if so, then he must see that the best procedures possible provide the necessary information so that it is in available form when needed.

The theory that the Systems Department will work on a project only when it is invited or ordered to is archaic. Such a statement says, in essence, that each department is a company within itself and that a company will increase its efficiency only as each departmental manager recognizes his unit's specific problems.

To be effective a systems man must transcend departments and divisions. The only way to do this is to have the Systems Department report to a vice president whose authority transcends that of departments and divisions. When this is arranged, the systems man goes into an operating area where he can do some good for the company as a whole. A systems man can, however, install a new procedure only when he gets agreement from all the areas affected or when, lacking such agreement, the vice president to whom he reports thinks it should be installed anyway. This type of operation keeps a systems man from becoming some kind of company gargoyle. The mature and intelligent systems man should be able to maintain good relations even though he may have to step on a few toes occasionally.

If the above can be effected, we will have satisfied the two conditions set forth earlier in this article. The systems man will have filled the communications void which plagues American industry. Doing so will help the systems man attain a professional status as a communication specialist and will help him become an important and recognized member of any good business administration team.

Steps in Establishing Systems Status

First Step. The first step in establishing systems analysis as a recognized member of the administrative team is to define or redefine the boundaries and responsibilities of systems men. The preceding paragraphs do not give a complete definition but they point in the direction this writer thinks systems men should go. Do not let the direction change to "he works on forms and things." A description of the responsibilities of a systems man should always include "he analyzes the communication procedures that keep management informed."

Second Step. The second step is for all systems men to unite so that the profession is presented as "*one.*" Systems men must agree upon their definitions.

Third Step. All systems projects in a company should be presented to management as they relate to and affect better communications, and only secondarily as they relate to cost reduction. In this way, management will become aware of the benefits to be derived from improved communications.

Fourth Step. SPA must expand its effort to publicize the systems man's image so that it will gradually become accepted as the custodian of communication systems.

Fifth Step. Systems men must take every opportunity to promote the definition of their profession. Explain it to everyone who will listen, inside or outside the company. Do you know of any housewives or high school students who do not know what a lawyer is? Do you know of any housewives or high school students who do know what a systems man is? **s/p/a**

Paper Work In Indiana

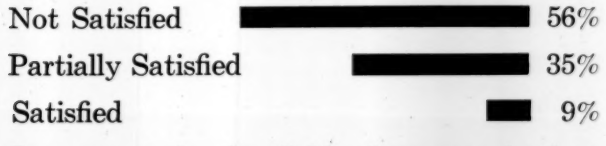
1960 Survey

D. R. Mayne

How Expensive Is Paperwork

▶ In spite of an estimated 19 per cent increase in population, the 1960 census is being handled at about $15 million less and six to eighteen months sooner than the 1950 census. This increase in efficiency is a tribute to paperwork simplification and mechanization.

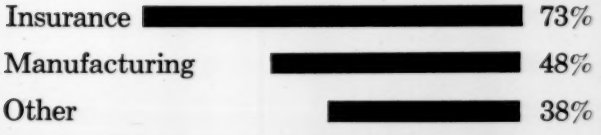
Paradoxically, while such tremendous improvements in paperwork processing are being made, a study* of Indiana companies shows that only 9 per cent of the top management which participated in this year's survey, report being satisfied with their companies' paperwork methods and progress.



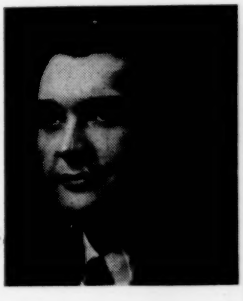
One expert in the field of communications recently said, "Half the cost of running our economy is the cost of information. No other field offers such concentrated room for improvement as does information analysis, yet it is only now that formal approaches are starting to appear."

Top Management Needs Better Information

The following dissatisfaction with information content and speed was also expressed by those who participated in this study:



Direct paperwork costs may be defined as costs for clerical functions performed in the plant as well as the office. Direct clerical costs must also include clerical functions performed by shop personnel such as production reports, inspection, receiving, and job time cards. The Bureau of Labor Statistics recently announced that for the first time in the history of this country, white collar workers now outnumber blue collar workers. There has been a fivefold growth of clerical workers since 1940, while the number of production workers has merely doubled. Because of the increased employee benefits, and increased demands for information by management, shop, and office, direct



D. R. Mayne is president of Mayne Associates, Indianapolis, Indiana. He has been associated with International Business Machines and the Standard Register Company. A graduate in business administration from Miami University (Ohio), Mr. Mayne serves on the board of directors of several midwestern companies. He is a member of the American Management Association, National Machine Accountants Association, National Association of Accountants, and National Sales Executives. He is a trustee of the Association of Management Consultants, Inc.

*Over nine hundred executives were interviewed. A 4-page questionnaire was answered by 108 corporations.

paperwork costs have become as important as direct labor costs.

Only 63 per cent of the participants in this survey felt they actually knew their paperwork costs. The costs reported averaged from 4.2 per cent of sales to 4.7 per cent of costs. Since this is considerably below the national average, one might conclude that the majority of the 63 per cent of the participants who felt they knew their costs — actually did not!

Indirect paperwork costs may be defined as hidden costs. Accounts are not set up for indirect cost of paperwork; however they are present in clerical activities and paperwork involved in maintaining control over production, inventory costs, or accounts receivable. Inadequate control may sometimes cost more than the direct clerical costs. These situations include excessive inventories, poor cash flow, high accounts receivable and lack of adequate and current labor costs. In some companies such costs may equal or surpass the direct apparent costs.

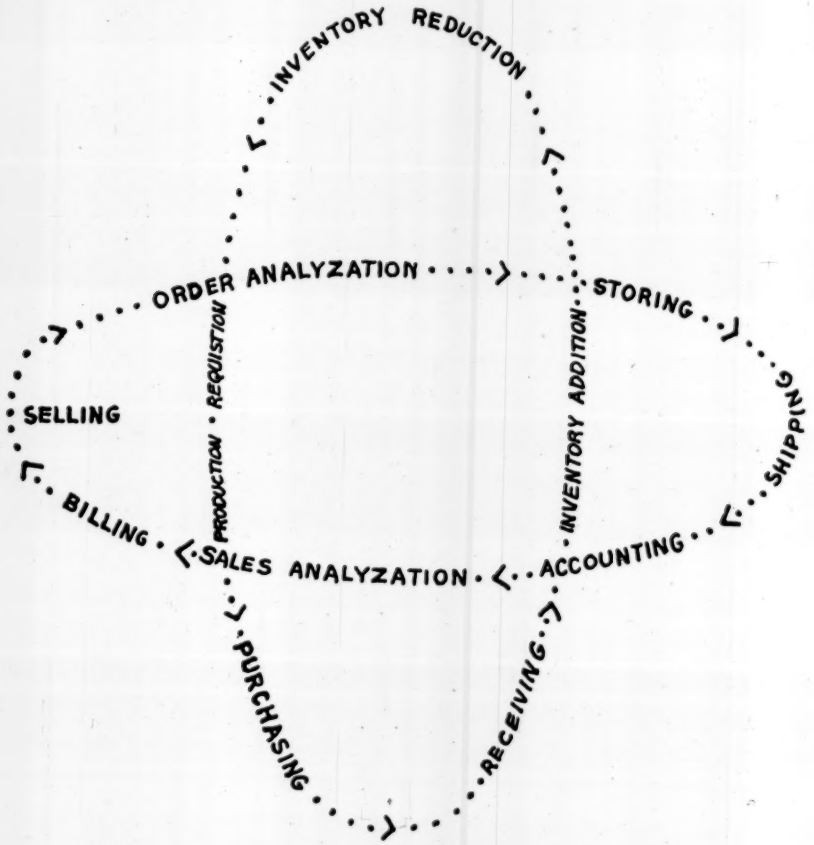
About 91 per cent of the management reporting for this survey expressed dissatisfaction with their companies' progress in paperwork and 46 per cent replied that they need more information faster. For the average manufacturer nationally, a direct savings in shop or office (not hidden) of $4,700 is the equivalent of adding $100,000 to sales every year.

Basic Problems

Three primary problems retard the improvement of information and the reduction of direct and indirect paperwork costs, as summarized from the many comments made by companies in this survey. These problems are:

1. Top management recognition
2. Know-how and time
3. Departmental barriers

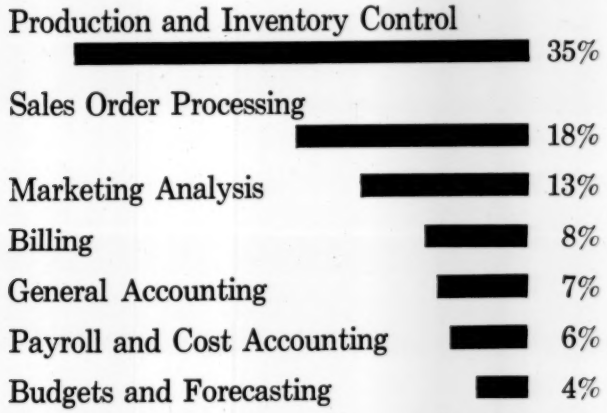
The main factor retarding the average company's improvement of information and reduction of costs is the problem of recognition by



top management. Clerical cost figures are misleading because almost every individual in the company — from the receiving clerk to the president — is involved in paperwork but not necessarily listed on the clerical payroll. Systems improvements can always be delayed for more important programs.

Examples of hidden costs seldom appear to be a paperwork problem — but they are. Management needs to recognize them as such and decide to act. More aggressive firms are taking advantage of new methods and equipment to improve control and reduce costs. One company claims that computers give more positive control over stock and inventories. Another has ordered a large scale computer that will process data from checks printed with magnetic ink to give its customers faster and more accurate service. Another has installed a new high speed order processing system that has reduced order processing time by 40 per cent to provide faster service and improved cash flow with an estimated savings of $55,000 annually. This is no small accomplishment where quick service to customers can make or break a sale, particularly in a tough competitive market.

The second factor reported is twofold: *Know-how* and *time*. When asked about areas of paperwork in which the most progress in simplification or mechanization could be achieved within the next five years, answers were as follows:



Paperwork associated with manufacturing has been neglected in the past because the majority of office equipment salesmen and systems men are most familiar with office operations generally associated with accounting and not production. They do not have the manufacturing experience or background necessary to create major improvements in production systems and methods. They shy away from such analysis situations as a bill of materials to determine total requirements or calculating the start date and the finish date for a process routing sheet. The same applies to sales when percentiles of market penetration are determined by using weighted factors on a county basis incorporating published potential buying power data. Of the companies reporting, 63 per cent said their accounting departments were responsible for simplification improvements of this type.

In addition to inadequate background of know-how referred to above, there is the problem of the know-how of the proper methods and equipment to use in a given situation — the right tool for the job. The field of office equipment and electronics is changing as fast as the missile industry. A major executive of the world's largest manufacturer of data processing equipment stated last month that his company has developed more new equipment during the last two years than during its previous fifty-year history. For example, skills and techniques must be developed in employee interviewing, data gathering, and work flow analysis. Flow process charts, operational flow charts, schematic flow diagrams, and work distribution charts developed to assist the experienced individual in collecting and analyzing data should be used. Companies reporting satisfactory progress were those which used trained and competent systems people, as skilled in their "profession" as a good surgeon or a trial lawyer is in his. In this world of magnetic ink, closed circuit television, optical scanning devices, and electronic computers, it is difficult to find technically competent personnel.

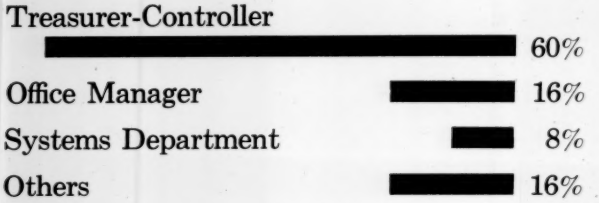
It is obvious that one must have the time as well as the know-how to improve operations. An individual who is tied down to the daily operation of a business cannot free himself sufficiently to gain this information and study operations. When competent people with the "know-how" and sound technical backgrounds can be used to improve operations on an integrated basis, the return can be quite handsome.

Another problem seems to be that few companies are achieving optimum results because

of departmental barriers. A production manager will not delve into areas responsible to the treasurer or the sales manager, and he will expect this consideration to be returned. Lines of authority are established (and are needed) which protect such departmentalization. Yet these lines must be wiped away to achieve optimum improvements in paperwork because the methods and systems used by one department have direct effects on other departments. While each department is earnestly attempting to reduce the mountain of paperwork within its given area, duplication of effort increases as the result of departmental barriers.

An integrated company-wide program is needed to secure optimum results. Such a program is possible either by placing this program under the direction of a corporate officer who is capable of cutting across lines of authority or by forming a committee of department heads working together. As long as departmental barriers exist, a company cannot achieve optimum results.

Who Is In Charge of Costs and Improvements?



What Can Be Done?

Problem Recognition. To control paperwork and office operations, management must face the fact that it has a major problem on its hands and that the problem warrants attention. Seventy-nine per cent of the companies of this study replied that they were doing something to cut office costs.

Savings Reported Being Achieved in Office Operations

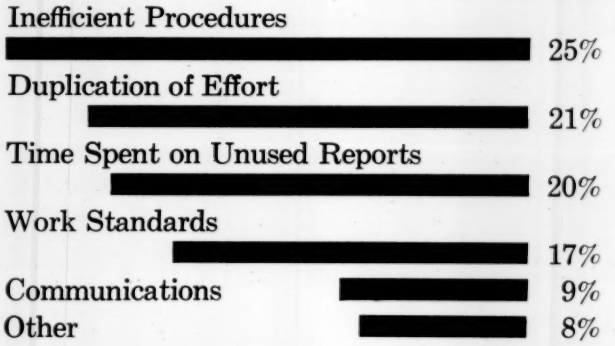
Maximum	$55,000
Minimum	$ 1,000
Average	$19,300

Integrated Approach. Procedures and systems must be integrated throughout an entire organization. On the basis of this study, production and inventory control appear to offer the greatest room for improvement. Control of sales, manufacturing, and accounting must all be coordinated for maximum benefit to avoid duplication of essentially similar paperwork in these various departments as well as to provide top management with the necessary data fast enough.

Competent Personnel. There is no substitute for "know-how." Competent and well-trained people must be used to achieve adequate results. Very large firms indicate that such improvements are generally handled by staff analysts, but medium-sized and small companies normally cannot afford competent staff analysts as a fixed operating expense. In the medium and small companies, improvement programs were reported as being conducted by treasurers, controllers, office managers, consultants, and department heads working together. For medium and small companies, consultants can often provide a worthwhile service. They have a fresh, objective approach, extensive "know-how," and do not become a part of the fixed overhead. Through consultants, medium and small companies can purchase on a part-time basis the same type of services available to larger corporations.

Simplify—Then Mechanize. Mechanization is not a panacea. It is foolish and expensive to mechanize a poor system. Before mechanizing, study and simplify the procedures and reports. Analyze *why* the work is done. Many economies are possible without mechanization such as combining forms, eliminating unnecessary postings, and simplifying the routing of the paperwork. Only after paper handling systems have been streamlined down to their essential functions can further advances be made by mechanization.

Common Sources of Waste and Inefficiency



Summary

When we undertook to conduct and publish our annual survey of paperwork and office methods, we hoped to reach two primary objectives: First, to discover in what areas improvements in methods were indicated and, second, to provide a yardstick by which participating firms could determine their individual progress in relation to other firms of comparable size.

Careful consideration of the data from our study seems to indicate that there is a widespread need for improvement in present methods of handling paperwork to insure the most efficient operation. According to the study, only 9 per cent of the Indiana companies included in the survey were satisfied with their present methods. Further individual company investigation and analysis in this vital area may prove most fruitful, since the average savings indicated by survey respondents who had recently overhauled their paperwork methods was $19,300 in *direct* annual savings alone.

The amount of savings possible in *indirect* paperwork costs is anybody's guess. The clue to this lies in the fact that 46 per cent of the respondents felt that top management does not receive adequate information fast enough to operate efficiently. A company must reflect efficient and economical practices in its paperwork methods as well as its production, if it is to compete profitably in this challenging modern business world. **s/p/a**

John R. Youngs

Electronic Business Machines, *J. H. Levenson, Editor; New York Philosophical Library Inc., 272 pp., 1960, $15.*

This volume is based upon a series of lectures delivered at Dundee Technical College by British and American experts about computers. The lectures have been rewritten and edited for publication so that businessmen, responsible for deciding about installing a computer, can find answers to three basic questions: (1) What are computers and how do they work? (2) What should be considered when reviewing the use of a computer? (3) What can computers do?

Arranged in three sections, each answers a specific question. Section No. 1, "Programming for Business Purposes," contains 7 chapters. The first six help develop an appreciation of computers and their ability to tackle specific programs. The theory and application of such topics as conditional jumps, exits from loops, sorting, and automatic coding are discussed in some detail. Chapter 7 reviews flow charting. Section No. 2, "Business Management and EDP," highlights the critical problem of how to fit an entirely new and expensive kind of equipment into an environment of people, small equipment, and information processing

routines. It details in brief and forceful language factors to be considered in such a move. Topics touched upon are revision and re-evaluation of current systems in terms of input-output, the ideal versus the practical and actual system, organizational and personnel changes, recruiting EDP personnel, system analysis and design, and selection of computers. Chapter 13 discusses approaches to computer costs — before, during, and after installation — and the cost and value of information derived. Chapter 14 discusses the impact of computers on auditing procedures.

The final section attempts to tell what computers can do. Chapter 17 discusses actual applications: airline routes and production control for a textile plant. Although not in detail, the logic behind the approach to each is described. Remaining chapters describe and analyze different types of equipment; paper tape, magnetic tape, storage, printers, and input devices. Chapter 18 is about telecommunications.

The book gives the uninitiated a broad picture about EDP with some detail about problems which must be faced in its use. The first 7 chapters, while interesting, are of little direct value to an executive who must make the *yes* or *no* decision. They are of more value to subordinates who must prepare recommendations. The second section, highlighting problems and considerations should be helpful to an executive. The section on equipment and applications, while interesting, is of less value to the man who makes the decision than the first two sections. (Reviewed by Jeffrey Keller, Management Advisory Services; member, Lincoln Center Chapter, SPA).

How to Communicate Policies and Instructions, *Joseph Cooper; BNA Incorporated, Washington, D. C., 348 pp., 1960, $14.75.*

Failure to communicate instructions properly is a direct cause of loss of income and/or unnecessary increased operating costs. Regardless of the quality of a product, it will lose sales appeal if the how-to-use-it instructions for the consumer are not clear and easily understood. Badly written or poorly illustrated instructions lose repeat sales. Other communication problem areas are company policy, training programs, and instructions from administrative to operating personnel.

Those faced with such communication problems will welcome this publication. It covers the techniques of planning, writing, illustrating, and publishing written instructions of all kinds. Published as a looseleaf manual, it is divided into three parts:

1. Planning and designing looseleaf manuals; systems and methods of writing and transmitting company policies, procedures, and job instructions.
2. Writing and illustrating consumer how-to-do-it instructions and employee training manuals.
3. Conveying ideas through visual aids.

Mr. Cooper's book is clearly written, suitably illustrated, and printed in an easy-to-read type. It is recommended for systems men and management personnel responsible for communicating instructions and ideas. (Reviewed by Norris B. Woodall, Commercial Credit Corporation; member, Baltimore Chapter, SPA).

Management and Corporations, 1985, *edited by Melvin Anshen and George Leland Bach; McGraw-Hill Book Company, New York, 253 pp., 1960, $5.50.*

At a symposium at the Carnegie Institute of Technology, fifteen distinguished leaders from business, law, education, the social sciences, religion, and philosophy contributed papers and participated in the discussions that form the contents of this book. No "blue sky" stuff; imagination and experience. The reader may not find the contents of this book to be spectacular, but if he is trying to improve his concept of the future, he will find some nourishing food for thought in it.

The entire book reflects the principal theme of the symposium — the necessity for corporations and managers to adapt during the next quarter century to major changes in their environments. Problems concerning the future functions and relationships of business management are discussed. Systems people will be especially interested in chapters dealing with the requirements, skills, and attitudes of managers in their co-existence with the "thinking" machines of the 1980's. How will traditional

business patterns be affected, particularly in the face of trends towards trans- and supra-national groupings?

This book challenges "status quo" thinking. Any systems man concerned with thinking about the future should give it his serious attention. (Reviewed by Richard W. Reynolds; F. W. LaFrentz & Co.; Lincoln Center Chapter, SPA).

Management Practices, *by Richard C. Anderson; McGraw-Hill Book Company, Inc., New York, 302 pp., 1960, $7.*

If you want to become president of a large corporation, read *Management Practices.* Dull but interesting for the serious reader, the book begins with a detailed outline of every step of a typical business organizational set-up. The first half, "The Elements of Management," considers planning, organizing, and appraising problems. The second half, "The Processes of Management," considers the operating of businesses as well as controls. Topics are considered in minute detail. For example, a section on "Salesmen" indicates how to solicit orders, verify inventory, and develop delivery dates. The author might have used more case studies to illustrate his theories and practices. A better title for the book might have been *Management: the Art, and Its Creation.*

This is a book of facts, not fiction. It is based on actual experience the author has had with U. S. Steel and Lockheed Aircraft. The book can be considered as a *tool* of the management trade. (Reviewed by Irving I. Solomon; Lincoln Center Chapter, SPA).

Probability, an Introducton, *by Samuel Goldberg; Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 322 pp., 1960, $7.95.*

This book has many well-chosen illustrations. It is particularly suitable for the non-mathematician, such as the systems analyst or manager. It brings the theory of probability to the level of the person without a background in calculus. There is a minimum of mathematical symbolization, so fearful to the layman. Therefore a person with a good background in algebra should be able to read the text with relative ease. The limitation to finite sample spaces does present some undesirable results, but it does not destroy the basic need and objective of the book — to communicate fundamentals about determining probabilities to those desiring an understanding of these concepts. (Reviewed by Edward A. Tomeski, Socony Mobil Oil Company; Lincoln Center Chapter, SPA).

Top Management Handbook, *edited by H. B. Maynard; McGraw-Hill Book Company, New York, 1,236 pp., 1960, $17.50.*

Sixty top managers from large and small companies have contributed chapters to this unusual handbook on various aspects of top management. The chapters are grouped into several parts: The Managing Function, Management by Objectives, Managing People, Measurement and Control, Managing the Future, Activity Area Management, and Other Aspects of Management.

The reader will get occasional rich new insights into some areas; others may seem to be submerged in platitudes. This is probably to be expected in a topic where basic principles can be disposed of in a few weeks of a college course. The art of management becomes more difficult to master as one approaches the top; the techniques of the art vary, of course, with the personality of the man applying them. The top manager has learned to apply such techniques effectively through painstaking analyses of day-to-day experiences and correction of mistakes. The "art" then is for the most part, non-transferable. Keep this in mind to protect yourself against disappointment as you study this handbook.

Sections of the handbook which explain "how we do it at our company" seem like public relations material. Information about certain technical aspects have already been covered in a more rewarding style in handbooks in specialized areas. However, despite this and intermittent spots of shallowness and oversimplification, the handbook is recommended for perusal by the systems professionals, although every reader may not agree upon the exact location of the high points of the book. (Reviewed by Richard W. Reynolds, F. W. Lafrentz & Co.; Lincoln Center Chapter, SPA). **s/p/a**

ARE WE ESTABLISHING GOALS OR ENGAGING IN PRETENTIOUS ACROBATICS?

▶ The few years that have passed since the establishment of the Systems and Procedures Association have witnessed a technological revolution that has no equal in the history of mankind. It has had a sobering impact on management and has brought to light deficiencies in our knowledge of management. During these years improvement of management capability has been a dynamic field of activity. The focal point of the activity has been the recognition that the success of management can be, to a large extent, measured in direct proportion to its ability to devise and utilize maximized systems operations. These years have witnessed, therefore, the rise of the systems man to a recognized position on the management team.

Because we are engaged in a life or death socio-economic cold war, Frederick R. Kappel, President of the American Telephone and Telegraph Company, recently stated:[1]

> "We are involved in one of the great ideological struggles of all times. We are so deep in this ideological struggle that it is hard to see it in perspective. But essentially it is a contest between two quite basic concepts. One is that men are capable of faith in ideas that lift their minds and hearts, ideas that raise their sights and give them hope, energy, and enthusiasm. Opposing this is the belief that the pursuit of material ends is all that life on this earth is about. The future of American business institutions is at issue in this struggle. I would also say that the vitality of American business may well be the decisive factor. How wisely we shape our goals, how skillful we are in leadership that brings out the best in people and increases their vigor, how ably we set forth our purposes, and win respect for our efforts, these things are the essence of business vitality; and these can spell the difference."

As we view our Association, its vitality is the power generated today that will assure success and progress in the tomorrows. There are indications today, however, that our efforts are not always aimed at sustaining and increasing our vitality. What are the symptoms of waning association vitality? *First* is the tendency of members to cling to old ways of working after they have been confronted with new situations. They must examine which areas are needed for the future and which shall be suspect. *Second* is the failure to define new goals that are both meaningful and challenging. *Third* is a decline in reflective thinking as compared to action thinking. *Fourth* is the growth of institutionalism. *Fifth* is the drift toward a secure and stable association but not a venturesome one. *Sixth* is the emphasis upon passing old wisdom on to new members. Lastly is the creation of a situation in which an association has little tolerance for criticism, penalties are placed on thoughtful and responsible critics, and all independent thinking is discouraged.

The continuing responsibility of association leadership is to accomplish today those things that will build strength into an association for the future. That leadership also has the basic responsibility to know which activities are building strength and which are merely pretentious acrobatics. That association leadership that is preoccupied with and fully consumed by day-to-day operations is not measuring up to its total responsibility. An association of individuals may be at the highest point of its prosperity—but may also be on its death-bed as far as its power to build for the future is concerned. Conversely, one that is struggling for survival may well be building up that store of vitality required for a flourishing future.

Many of the problems that currently confront our Association are the by-products of a growing and maturing environment. Let us not hit the "panic button"; rather, let us act as mature individuals who have an established objective in our personal, association, and business life, and who wish to re-evaluate goals.

Several times since the founding of our Association, the membership has engaged in an assessment of its organizational structure. This action is an important phase, but it alone will not cope with all problems that accompany growth. The chronic problem continues to be a failure to establish obtainable goals, to implement the necessary policy to attain these goals, and then to incite the membership to attain them. I therefore pose this question: Are we currently going through another phase of organizational acrobatics, or are we attempting to set new goals for future association activities? **s/p/a**

(Norman J. Ream, Executive Vice President, SPA)

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1. Frederick R. Kappel, *Vitality in a Business Enterprise*, McGraw-Hill Book Company, 1960, p. 102.

THE INTERNATIONAL SYSTEMS MEETING 1961

HOTEL STATLER **HOTEL PICK-CARTER**

Cleveland, Ohio

October 8-9-10-11, 1961

ATTENTION

The increase from four to six issues yearly, the increase in selected material presented in each issue, and the increase in the size of the magazine, all contribute to the necessity of increasing subscription rates. The new rates, however, will not become effective until June 1, 1961.